



# DOCUMENTATION

## **Visual Advanced Production Scheduler (VAPS)**

Version: **1.3** | as of 2 October 2020

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## 1. Release and version status

### 1.1. Is the VAPS available for BC/NAV, for cloud/on-prem, for all partners? And when?

Learn about "all things availability" when it comes to the Visual Advanced Production Scheduler.

#### 1.1.1. Is the VAPS available for Dynamics 365 Business Central and Dynamics NAV?

No, the VAPS is only available for Dynamics 365 Business Central. The minimum version required is Business Central v14 (cu1).

#### 1.1.2. Is the VAPS available for Business Central on-prem and cloud?

The version 1.0 (released on 17 January 2020) is just available for Business Central on-prem. We intend to provide a version for AppSource which as such supports Business Central cloud during Q1 2020.

#### 1.1.3. Is the VAPS available for sale?

Yes, the VAPS is available for sale and to be implemented at and used by customers. Version 1.0 was released on 17 January 2020.

#### 1.1.4. Is the VAPS available for all NETRONIC partners?

No. The VAPS requires specific skills and expertise as it enhances and changes Business Central significantly.

Please reach out to [sales@netronic.com](mailto:sales@netronic.com) if you want to achieve the VAPS certification.

### 1.2. Where can I find the VAPS release notes?

Learn how to find the release notes for the Visual Advanced Production Scheduler. Learn how you can check if you're on the latest version. Learn what is new.

The release notes of the Visual Advanced Production Scheduler can be found here:

<https://www.netronic.com/microsoft-dynamics-365-business-central/visual-advanced-production-scheduler/release-notes>

## 2. Installing the VAPS

### 2.1. How can I install the VAPS in my on-prem environment?

Learn where and how you get the runtime package of the VAPS

First, you as a partner need to become "VAPS certified". Talk to [sales@netronic.com](mailto:sales@netronic.com) to find out details about the certification process.

Once you are VAPS certified, you'll get access to our "NETRONIC VAPS Partner Community". It is based on Microsoft Teams, and your place to go to get your demo version/ runtime package of the product as well as Marketing and Sales collateral.

#### 2.1.1. Prerequisites to install the VAPS:

- An **up and running full-fledged** Dynamics 365 Business Central Installation
- Minimum required version: **Spring 2019/v14** - cumulative update 1
- Access to the backend via the "**Business Central Administration Shell**" or the "**NAV Container Helper**"
- The Web Client needs to be enabled – and using the **Web Client is highly recommended**

#### 2.1.2. The VAPS D365 on-prem can be installed in two different ways:

##### I. THE NAVSERVER INSTANCE IS INSTALLED DIRECTLY ON THE COMPUTER

What is needed for the installation:

- Admin access to the NAV/BC server computer
- Access to the NAV/BC Admin Shell & Development Shell with admin rights on this computer
- The "Name" of the NAV/BC ServerInstance into which the extension should be installed
- An updated NAV/BC license installed, which has the extension objects included
- Access to the NAV/BC Web Client to test the installation
- Access as "SUPER" user to NAV/BC, to assign Permission Sets to other users

Installation instructions:

- Run the "**Business Central Administration Shell**" as administrator and enter the following commands:
- Publish-NAVApp -ServerInstance NAV -Path "NETRONIC Software GmbH\_Visual Advanced Production Scheduler\_1.x.y.z\_runtime.app" -SkipVerification
- Sync-NAVApp -ServerInstance NAV -Name "Visual Advanced Production Scheduler"
- Install-NAVApp -ServerInstance NAV -Name "Visual Advanced Production Scheduler"
- If the install call gives an error regarding "DataUpgrade", try  
Start-NAVAppDataUpgrade -ServerInstance NAV -Name "Visual Advanced Production Scheduler"

- Open the NAV/BC Web Client as user with “SUPER” permissions
- Check the “extension management” page if the extension got installed properly
- Check if you can open/run the extension
- Assign the “NETRONIC VAPS” permission set to all users which should work with the extension.

## II. THE NAVSERVER INSTANCE IS RUNNING FROM A DOCKER ENVIRONMENT

What is needed for the installation:

- Admin access to server computer and the corresponding Docker environment
- Access to a powershell with the NAVContainerHelper module installed
- The “Name” of the NAV/BC Container into which the extension should be installed
- An updated NAV/BC license installed, which has the VAPS objects included
- Access to the NAV/BC Web Client to test the installation
- Access as “SUPER” user to NAV/BC, to assign Permission Sets to other users

Installation Instructions:

- Please enter the following command with the help of the "**NAV Container Helper**":
- Publish-NavContainerApp -containerName navserver -appFile “NETRONIC Software GmbH\_Visual Advanced Production Scheduler\_1.x.y.z\_runtime.app” -skipVerification -sync -install
- If the publish call gives an error regarding “DataUpgrade”, try  
Start-NAVContainerAppDataUpgrade -containerName navserver -Name “Visual Advanced Production Scheduler”
- Open the NAV/BC Web Client as user with “SUPER” permissions
- Check the “extension management” page if the extension got installed properly
- Check if you can open/run the extension
- Assign the “NETRONIC VAPS” permission set to all users which should work with the extension.

### 2.2.How can I deploy the VAPS into a cloud infrastructure?

If you want to use the VAPS in a cloud environment you can download the app from Microsoft [AppSource](#).

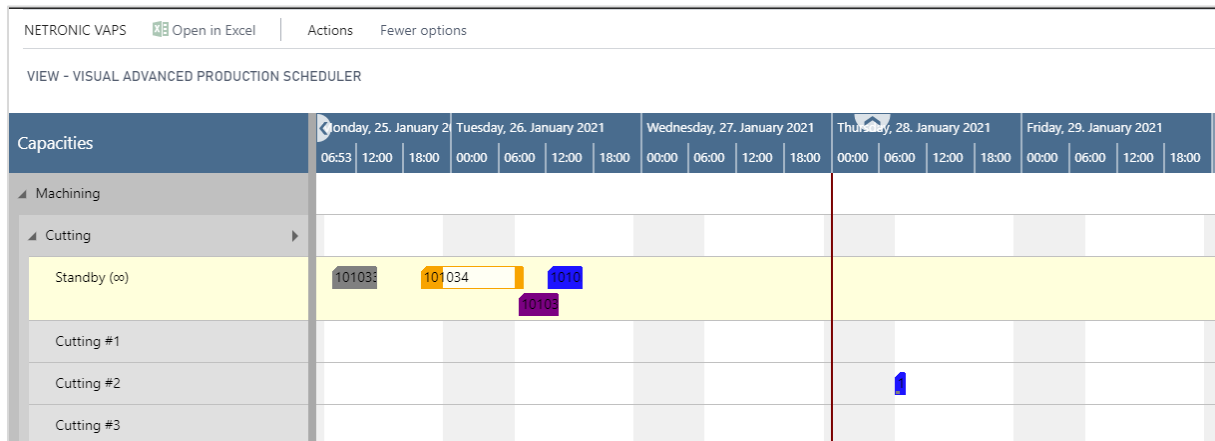


### 3. Look and feel of the visual schedule

#### 3.1. The structure of the schedule

The VAPS provides you with a visual drag & drop frontend to manage your production schedule.

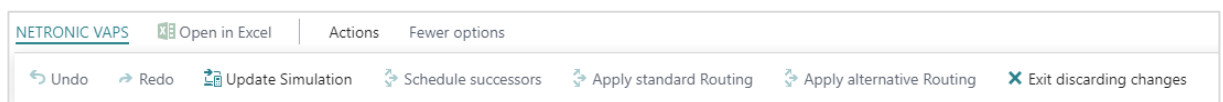
Since the VAPS is a Gantt Chart, it naturally has all its characteristics and elements:



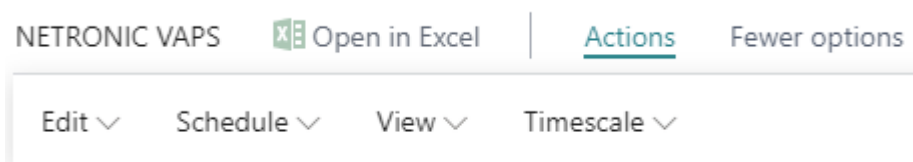
- A time scale at the top.
- A table at the left.
- On the right below the time scale, a diagram displaying the schedule with a calendar in the background indicating work free periods in grey while working times appear in white.
- In addition, a menu ribbon is placed above the plan:



The item “NETRONIC VAPS” summarizes all menu options that we think are the most frequently used ones:



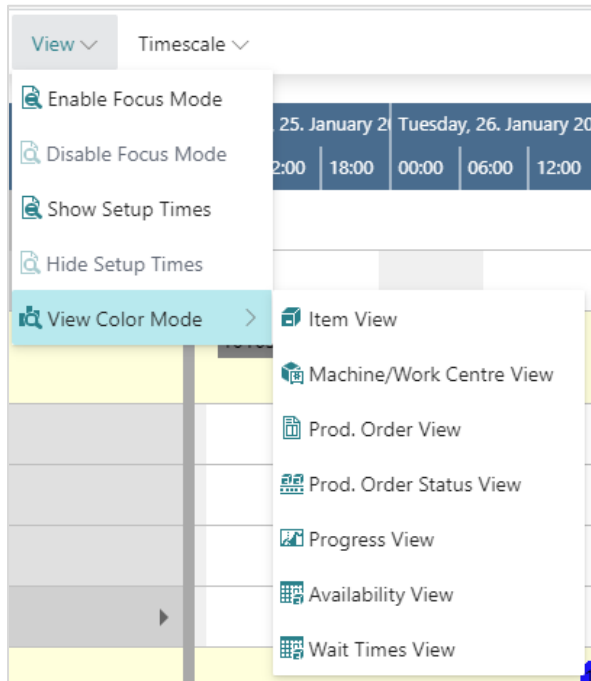
All options of the VAPS can be found under “Actions”:



In case the “Actions” item is not visible in the menu ribbon, click “More options”. To hide it again, click “Fewer options”.

Please note, that, depending on the task you are currently working on (setting-up the VAPS, working in a simulation etc., the contents of the menu ribbon will differ.

### 3.2.View color modes



The VAPS offers different views that let you stress different aspects of your plan by defining and using certain colors for the bars depending on the things you want to highlight. This will help you tackle certain challenges and answer certain questions. The links will lead you to the detailed explanation of the respective view:

- Item View
- Machine/Work Center View
- Production Order View
- Production Order Status View
- Progress View
- Availability View
- Wait Times View

### 3.3.The time scale part of the schedule

The time scale is one of the three main areas in your schedule and is positioned at the top of the view.

Capacities	Mo, 25. Jan 2021 05:55   12:00	Tu, 26. Jan 2021 00:00   12:00	We, 27. Jan 2021 00:00   12:00	Th, 28. Jan 2021 00:00   12:00	Fr, 29. Jan 2021 00:00   12:00
------------	-----------------------------------	-----------------------------------	-----------------------------------	-----------------------------------	-----------------------------------

The time scale covers the period that was defined in the simulation's filter. This is the time from the earliest date to the latest date.

## CREATE SIMULATION

### Saved Settings

Changes to the options and filters below will be saved only to: 'Last used options and filters'

Use default values from: ..... Last used options and filters

### Filters


Description ..... Simulation Created on 08/05/20 10:10 AM


Minimum Status ..... ▼

Earliest/Latest Date Input Type ..... Absolute Date ▼

Earliest Date Formula .....

Latest Date Formula .....

Earliest Date ..... 3/1/2020 

Latest Date ..... 3/31/2020 

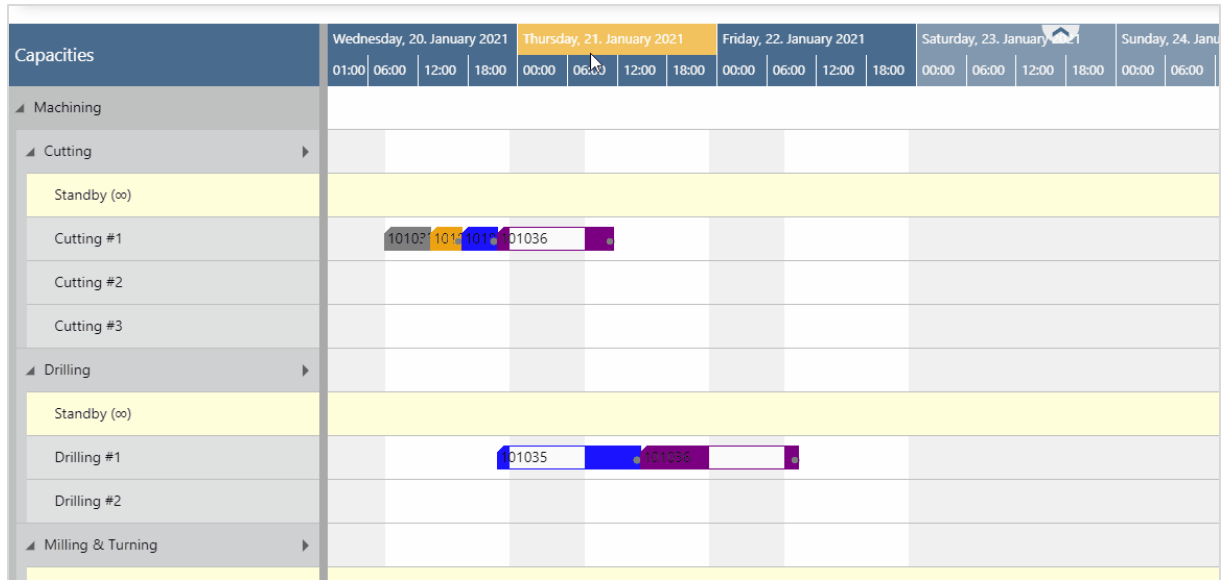
Default View Color Type ..... Item View ▼

### 3.4. Zooming and scrolling

The VPS offers various options of adjusting the size of your working area and going directly to a particular place in your diagram.

### 3.4.1. Increase/reduce time scale solution

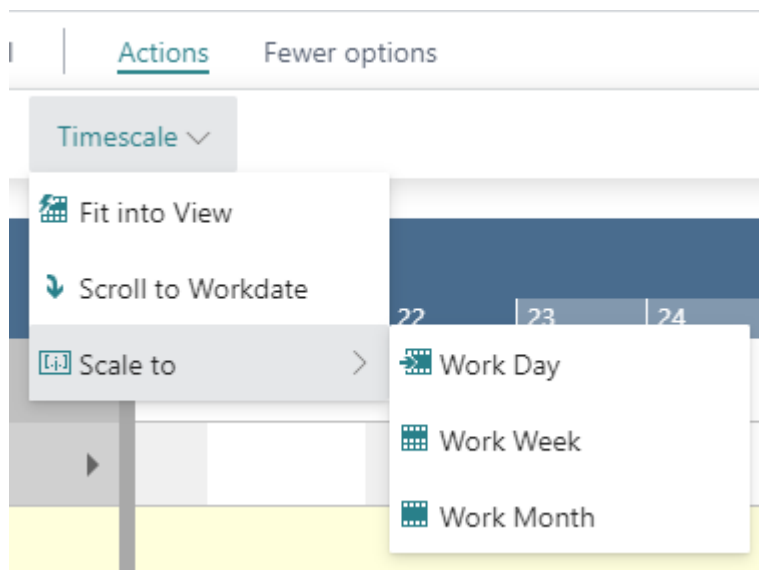
Depending on how much detail or summary is required, you can either increase or reduce the time scale solution by mouse wheel or touchpad (move two fingers up and down on your touchpad) within the time scale.



### 3.4.2. Show orders of a certain timespan only

A more precise way of showing certain parts of your plan is offered by the options of the "Timescale" menu items. Click the according one to show either

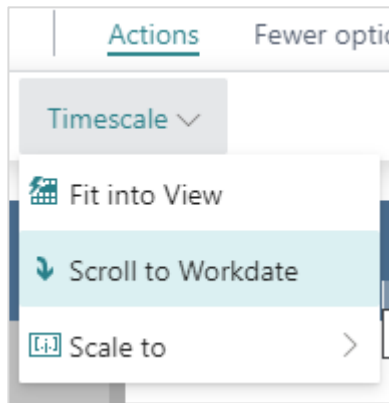
- all orders of your current work day
- all orders within a week starting from the current work date
- all orders of a month starting from the current work date



### 3.4.3. Scrolling

The VAPS offers the following options for quickly navigating to certain positions in the diagram:

- the common scrolling options by vertical and/or horizontal scrollbar
- dragging the timescale either right or left
- scroll directly to the Dynamics 365 Business Central work date by selecting the corresponding item from the "Actions" menu.



### 3.4.4. Return to default time range

Select "Fit into view" to switch directly to the timescale as defined in the filter settings of the simulation.

## 3.5. The table part of the schedule

The table is one of the three main areas in your schedule and is positioned at the left. It shows your resources grouped by work center groups, work centers, and machine centers.

### 3.5.1. The "Standby" resource

The standby resource does **not** exist in your Dynamics 365 Business Central machine centers. It is a virtual machine center that we automatically create in every work center. It contains all production order routing lines/operations that are **not yet scheduled** from within the VAPS, and hence are just scheduled by the Business Central scheduling run. The standby resource gets highlighted by a yellow background and an infinity symbol next to its name:

Capacities	February 2021															
	Wk 06		Wk 07								Wk 08					
	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
▲ Machining																
▲ Cutting ▶																
Standby (∞)						1	1									
Cutting #1 ▶			10100101010101				11101018									
Cutting #2 ▶					1101005											
Cutting #3 ▶																
▶ Drilling ▶					101001010081		11101011			1110101						

Please note that

- the standby resource always is treated as a resource with infinite capacity
- all other machine centers are treated as finite capacity resources (with a capacity of 1)

### 3.5.2. Collapsing and expanding

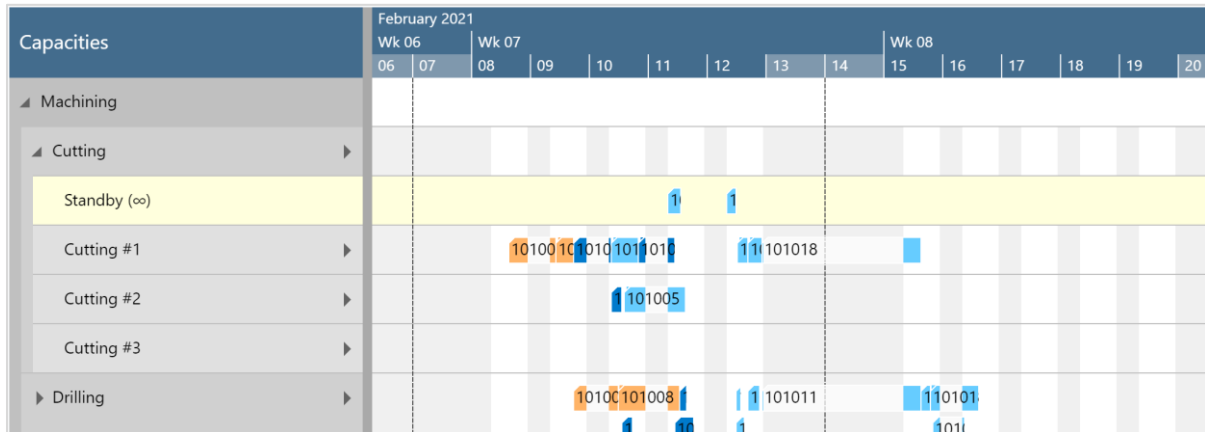
The symbols in the table shown below allow to collapse and expand work center groups and work centers, thus hiding details or rendering them visible.



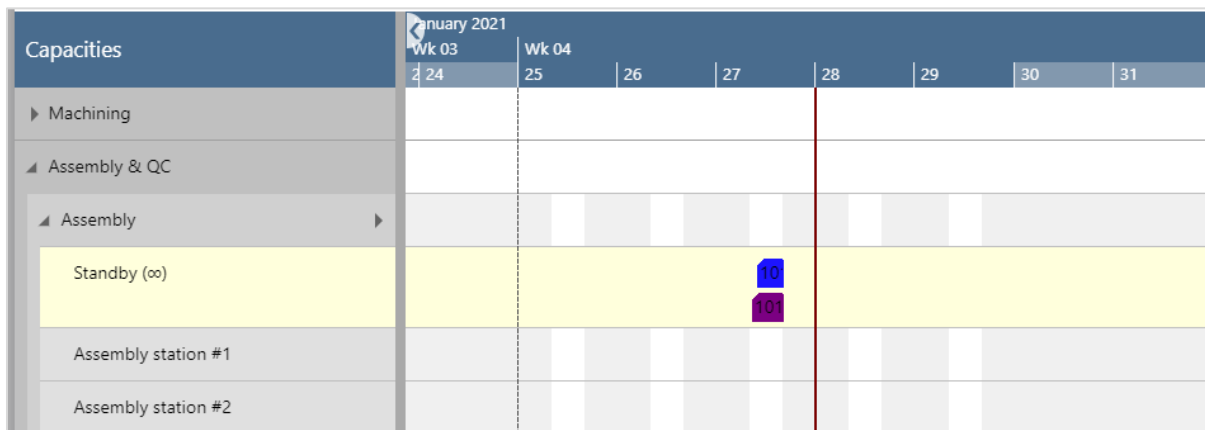
In the picture below, the work center group "Machining" is expanded, the relating work centers are collapsed:

VISUAL ADVANCED PRODUCTION SCHEDULER   WORK DATE: 1/28/2021																
NETRONIC Promoted Open in Excel Actions Fewer options																
Capacities	February 2021															
	Wk 06		Wk 07								Wk 08					
	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21
▲ Machining																
▶ Cutting			101001	101010	101011	1	111010	18								
▶ Drilling			101001	101008	1		1	101011		110101						
▶ Milling & Turning			10	101008	1					101010	101011	101012	101013	101014	101015	101016
▶ Painting			101009	101002						101011	101012	101013	101014	101015	101016	101017
▲ Assembly & QA																

Now, the work center "Cutting" is expanded, showing all its operations:



Please note, that in collapsed Work Center Groups, no operations are shown:

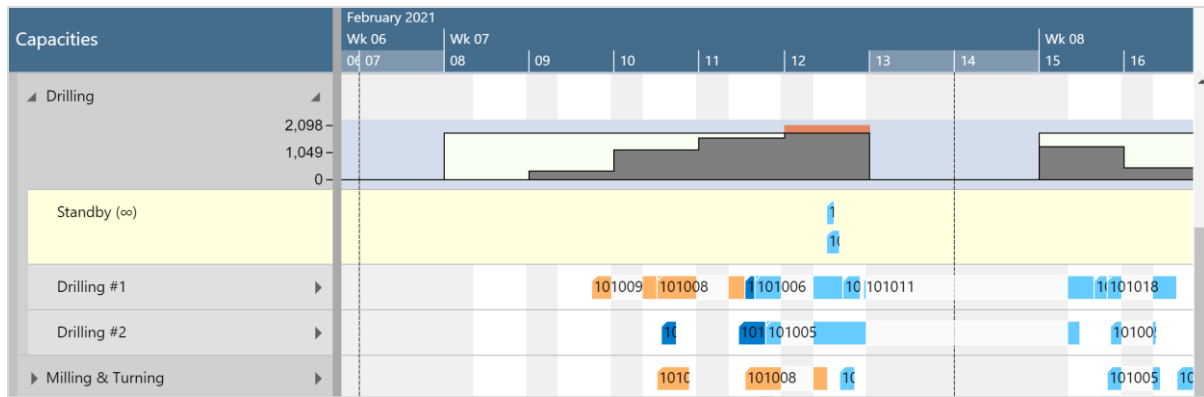


### 3.5.3. Show/hide the capacity curve

At the right hand side next to the work center's name, you see a right facing triangle:



Clicking this symbol will either show or hide the capacity curve for this work center. The picture below shows the histogram for the "Drilling" work center:



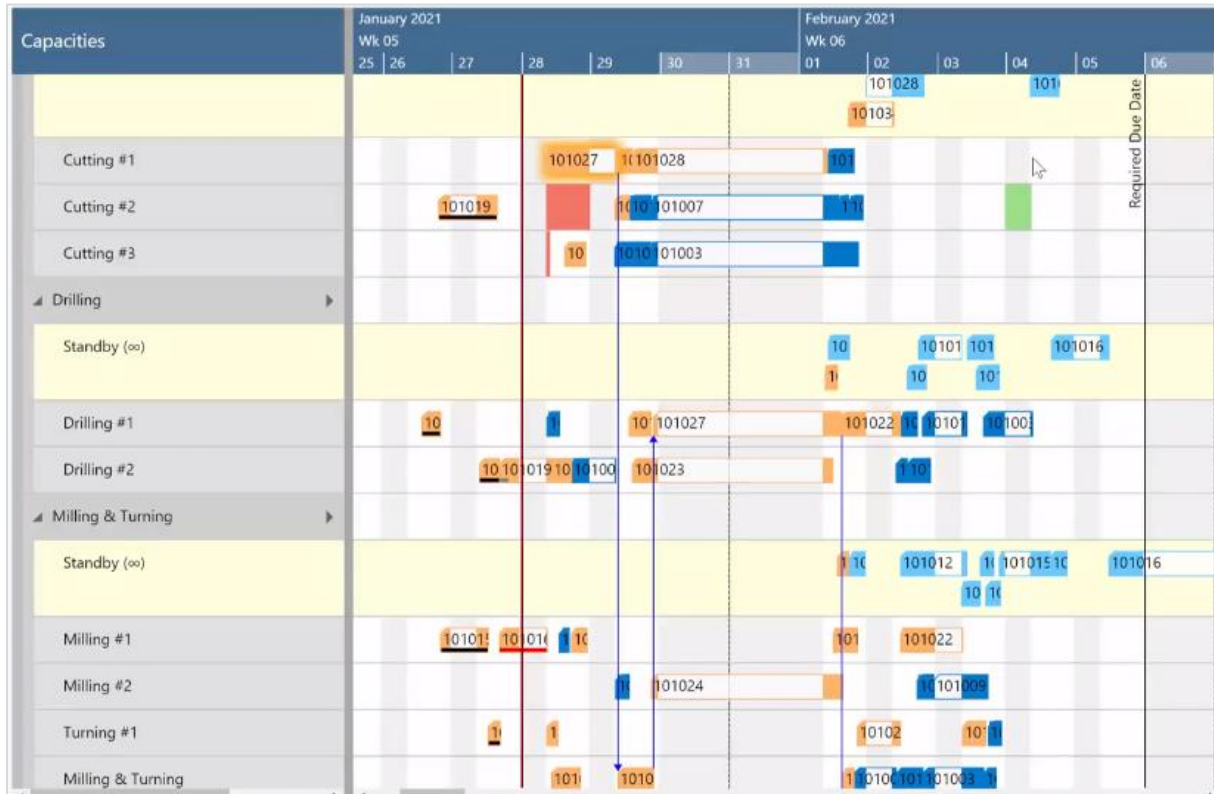
The histogram is a capacity utilization chart:

- The outer (black) line shows you the maximum available capacity per day (derived from the capacity of the underlying machine centers).
- The grey filled area indicates how much of that available capacity will get utilized by the current schedule.
- The red area shows you that based on the current schedule, you require more capacity than you have available on Friday, February 12.



### 3.6. The graphical part of the schedule

The graphical part - the diagram - is one of the three main areas in your schedule and is positioned in the middle of the view. It shows you which machine center is working on which production order routing line/operation and when.



### 3.6.1. The elements of the graphical part in detail

## Bars

Each production order routing line/operation of a production order is represented by a bar that is either colored or white. The colored area of a bar indicates that this timespan is during the work time of the underlying machine center. The white area of a bar indicates that this timespan is during the non-work time of the underlying machine center (also see below "Calendar". The bar color depends on the selected color scheme (see below).

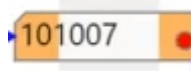
The following information can be gathered from optical indicators:

- Currently marked operation

- Operation changed but not saved yet

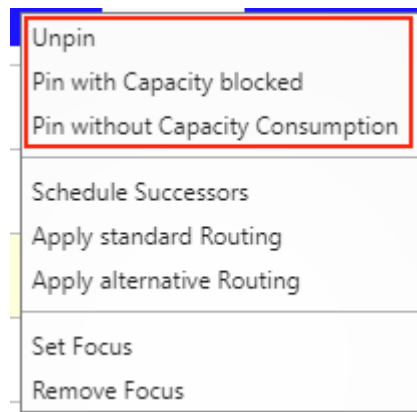


- Violated due date



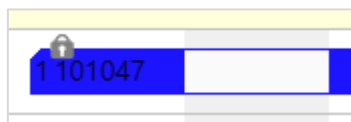
- **Pinned operations**

The operations context menu allows to pin operations so that they can't be moved.

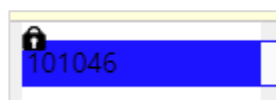


The different options are visually indicated as follows:

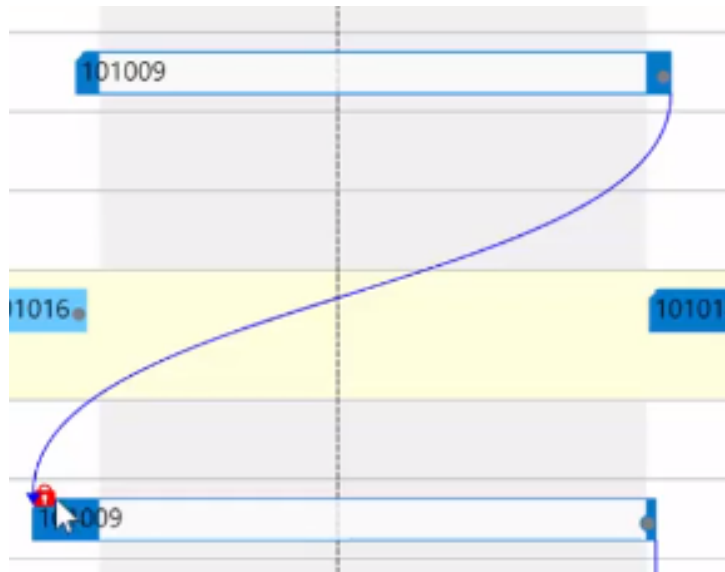
- Pin operation without consuming capacity



- Pin operation consuming capacity

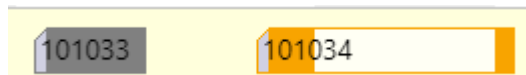


- Link violation after having pinned an operation. The picture below shows that the predecessor of a pinned operation was moved behind this operation

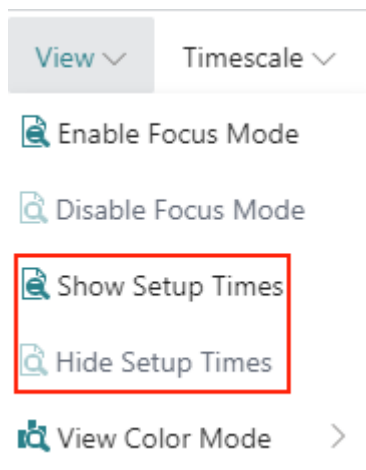


- Setup times

The setup times can be visualized as light grey section at the beginning of the bar.



You can switch between showing and hiding the setup times by a menu item:



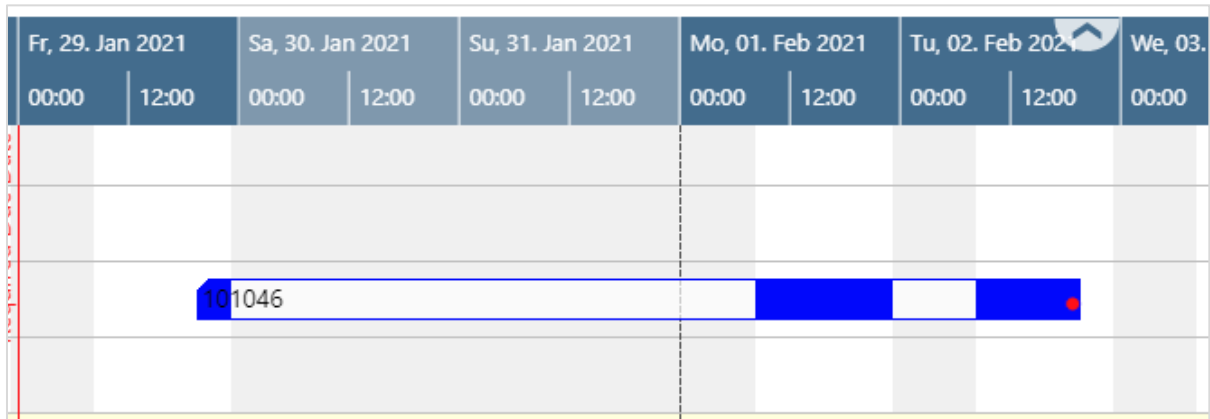
The color representing the setup time can be easily specified in the VAPS color settings:

## Color Setup

General	
Default Item Color . . . . .	#0008ff ...
Default Machine/Wor... . . . .	#0008ff ...
Default Production Q... . . . .	#0008ff ...
Setup Time Color . . . . .	d0d0e1 ...

### 3.6.2. Calendar

The grey and white area in the background visualizes the work and non-work periods of the respective work/machine center. They are derived from the respective shift calendars.



### 3.6.3. Progress

For production order routing lines of **released** production orders a progress bar is displayed below the actual bar being based on the posted quantity consumption. The color of the progress bar appears as follows:

- finished: black



- still in progress: grey



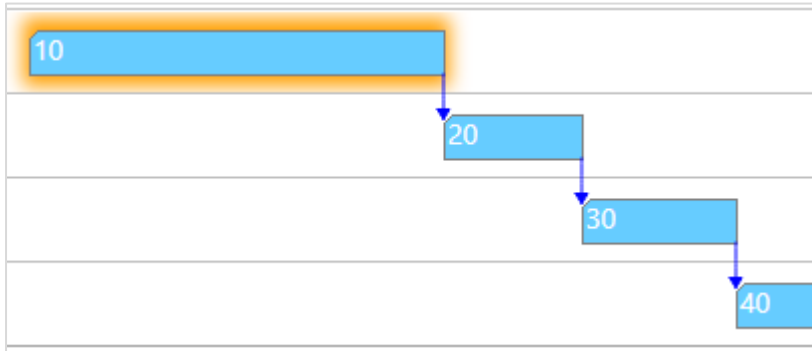
- still in progress but more quantity booked than initially planned: red



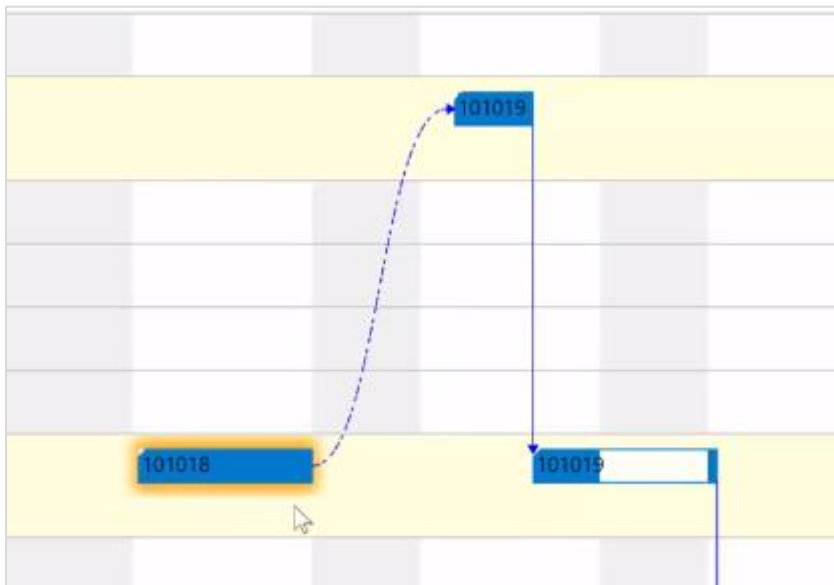
### 3.6.4. Links

Predecessor/successor relations are shown as arrows ("links") between the bars. They are only shown for the production order that is currently selected.

- links between operations of **one** production order

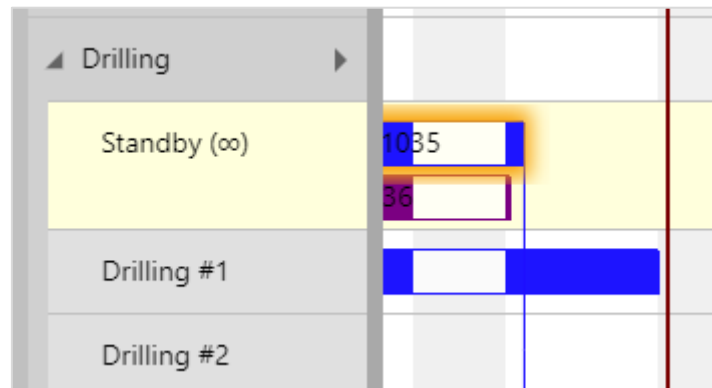


- links between operations of different production orders if they are linked to each other by reservations (make to order) OR links between production order lines coming from one production order (make to stock)




### 3.6.5. Work date

A red vertical line in the chart indicates the work date, this usually being the current date.



### 3.6.6. Required due date

The required due date is a specific VAPS field that you can set on the "Production Order" card:

Required Due Date ..... 2/2/2021 

This date can only be set and changed by the user. We recommend to set this date in case you have hard due dates for one or more specific production orders.



### 3.6.7. The tooltip

The tooltip of the VAPS provides further details about an operation and is customizable.

<b>No.:</b>	3002
<b>Item.:</b>	3 Operations Subcontracting in Middle1 Operation Simple Subcontracting
<b>Status:</b>	Firm Planned
<b>No.:</b>	101034
<b>Prod Order Description:</b>	3 Operations Subcontracting in Middle1 Operation Simple Subcontracting
<b>Last Date Modified:</b>	04/14/20
<b>Quantity:</b>	20
<b>Required Due Date:</b>	01/28/21
<b>Operation No.:</b>	20
<b>Setup Time:</b>	10
<b>Starting Time:</b>	11:50:00 AM
<b>Starting Date:</b>	01/27/21
<b>Ending Time:</b>	1:50:00 PM
<b>Ending Date:</b>	01/28/21
<b>Alternate Routing Set:</b>	
<b>Category:</b>	
<b>Work Centre:</b>	Subcontractor 1
<b>Machine:</b>	

### 3.6.8. The "Standby" resource

The standby resource does **not** exist in your Dynamics 365 Business Central machine centers. It is a virtual machine center that we automatically create in every work center. It contains all production order routing lines/operations that are **not yet scheduled** from within the VAPS, and hence are just scheduled by the Business Central scheduling run. The standby resource gets highlighted by a **yellow background** (and an infinity symbol next to its name in the table part):

Capacities	February 2021															
	Wk 06		Wk 07								Wk 08					
	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
▲ Machining																
▲ Cutting ▶																
Standby (∞)						1	1									
Cutting #1 ▶				10100101010101			11101018									
Cutting #2 ▶					1101005											
Cutting #3 ▶																
▶ Drilling					101001010081		11101011			1110101						

Please note that

- the standby resource always is treated as a resource with infinite capacity
- all other machine centers are treated as finite capacity resources (with a capacity of 1)

### 3.7. Navigating in the plan

The VAPS offers various options of adjusting the size of your working area and going directly to a specific position in your plan

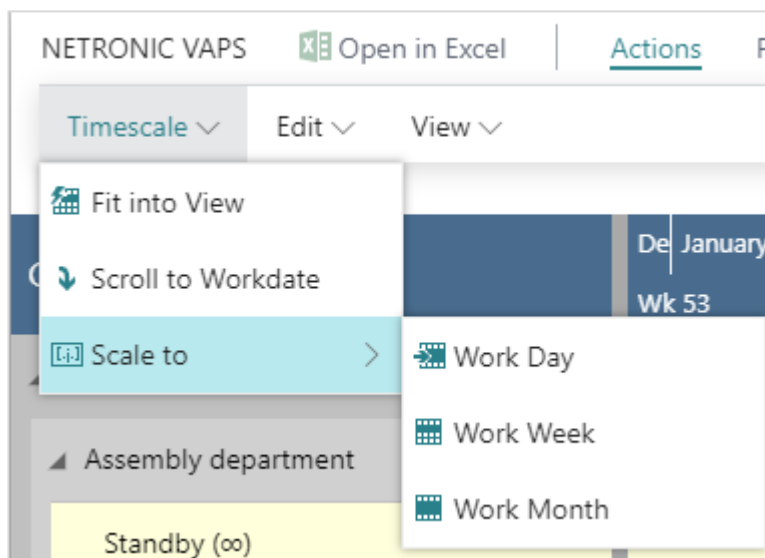
#### 3.7.1. Adjust the time scale

Depending on how much detail or summary is required, you can either increase or reduce the time scale solution by mouse wheel or touch pad.

#### 3.7.2. Show operations of a certain timespan only

Click the according item to show either

- all operations of your current work day
- all operations within a week starting from the current work date
- all operations of a month starting from the current work date

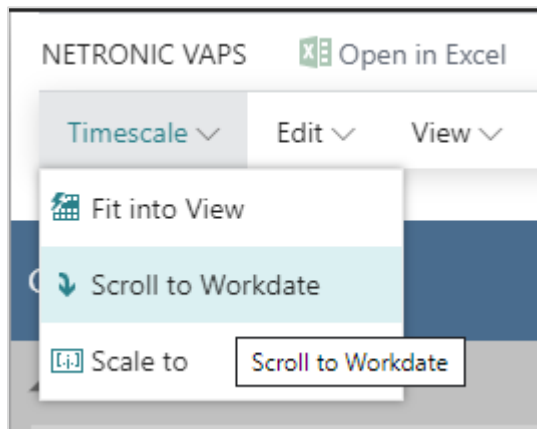


#### 3.7.3. Scrolling

The VJS offers the following options for quickly navigating to specific positions in the diagram:



- the common scrolling options by vertical and/or horizontal scrollbar
- dragging the timescale either right or left by mouse
- scroll directly to the Dynamics 365 Business Central work date by selecting the corresponding item from the “Actions” menu.



#### 3.7.4. Adjust the width ratio between table and diagram

You can modify the width ratio between the table and the diagram by moving the vertical splitter bar between them.

#### 3.7.5. Return to default time range

Select "Fit into view" to switch directly to the timescale as defined in the simulation's settings.

## 4. The view color modes

### 4.1. What does the Item View (color mode) show?

The Item View helps you to focus on production orders for certain items.

The Item View highlights production orders for items that you want to visually stand out. For that reason, you can define a default item color in the color setup and item-specific colors on the item card.

**The Item View is useful if you have certain items that require a specific attention. This could e.g. be items for production orders that are very time-sensitive. Or it could be items where the cost of material are very high.**

#### 4.1.1. How to apply the Item View

You can apply the Item View in two ways:

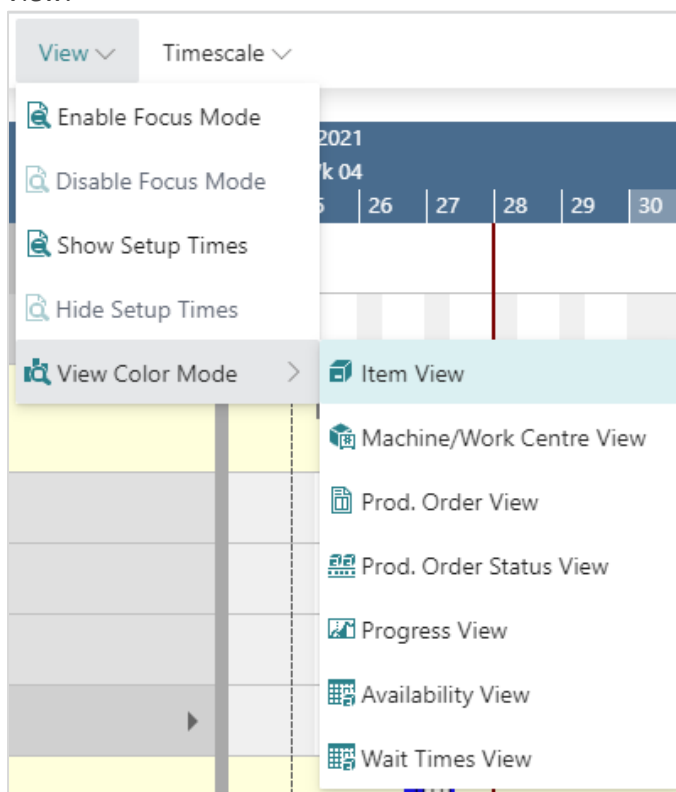
1. On the "production simulations" page, you can choose it at "default view color type":

← PRODUCTION SIMULATIONS | WORK DATE: 1/28/2021

Search Edit List Delete Create Simulation Publish Simulation

DESCRIPTION	DEFAULT VIEW COLOUR TYPE	CRE
Simulation No. 0 on 07/22/19	Prod. Order Status	7/22
Simulation No. 1 on 07/22/19	Item View	7/22

2. When you are in the visual schedule, you can select Actions --> View Color Mode --> Item View:



**Important to know: the item color is applied to an entire production order (line).**

#### 4.1.2. Change default colors

Of course, you can adjust the default colors being used for items when the Items View is applied, to your individual needs. This can be done in the according area in the "Color Setup" - the below picture showing the default item color coming with the VAPS:

General	
Default Item Color	#0008ff blue
Default Machine/Wor...	#0008ff
Default Production O...	#0008ff
Setup Time Color	d0d0e1

#### 4.1.3. Change color for individual items

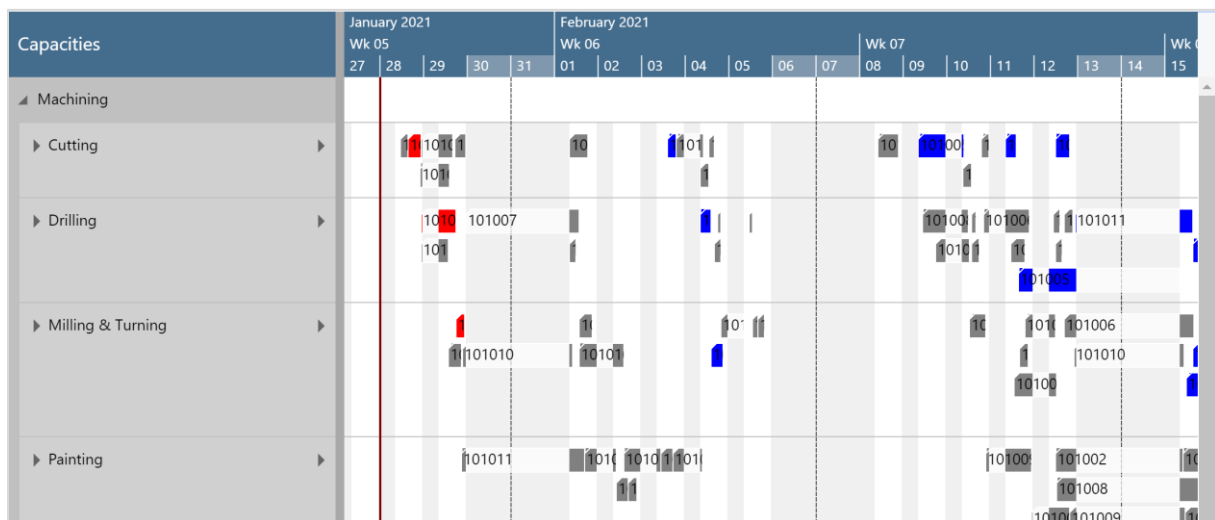
If, for some reasons, you want to highlight one or more specific items, you can do so by changing their individual color on the respective item card:

Item		Show more
No.	1000	Base Unit of Measure PCS
Description	Bicycle	Item Category Code
Blocked	<input type="checkbox"/>	Color (VAPS) #0cf151
Type	Inventory	

#### Example

The below screenshot shows a production schedule with the Item View applied. The following settings are used:

- Default item color = grey
- Item color "frame" = blue
- Item color "rim for mountain bike" = red



## 4.2. What does the Machine/Work Center View (color mode) show?


The Machine/Work Center View helps you to focus on production orders for certain items. It highlights production orders that are processed through certain work or machine centers. For that reason, you can define a default machine/work center color in the color setup and e.g. machine center-specific colors on the machine center card.






**The Machine/Work Center View is particularly useful if you have one (or a few) bottleneck resources that require your special attention. In such a case, you can make them visual stand out with this view.**

### 4.2.1. How to apply the Machine/Work Center View

You can apply the Machine/Work Center View in two ways:

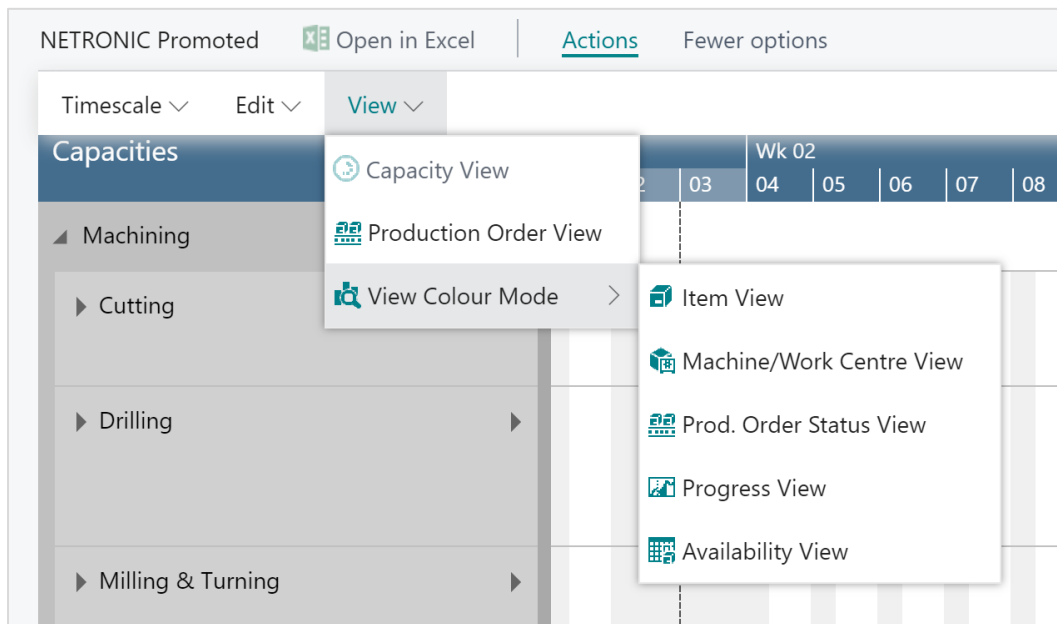
1. On the "production simulations" page, you can choose it at "default view color type":


PRODUCTION SIMULATIONS | WORK DATE: 1/28/2021

 Search
  Edit List
  Delete
  Create Simulation
  Publish Simulation

DESCRIPTION		DEFAULT VIEW COLOUR TYPE	CRE
	Simulation No. 0 on 07/22/19	Prod. Order Status	7/22
	Simulation No. 1 on 07/22/19	⋮ Machine/Work Centre V	7/22

2. When you are in the visual schedule, you can select Actions --> View Color Mode --> Machine/Work Center View:



**Important to know: the machine center color is applied to single production order routing lines/operations.**

#### 4.2.2. Change default colors

Of course, you can adjust the default colors that are used when you apply the Machine/Work Center View to your individual needs. This can be done in the "General" area in the "Color Setup" - the below picture showing the default machine/work center color coming with the VAPS:

General						
Default Item Color	#0008ff	...	Default Production O...	#0008ff	...	
Default Machine/Wor...	#0008ff	blue	...	Setup Time Color	d0d0e1	...

#### 4.2.3. Change color for an individual Machine/Work Center

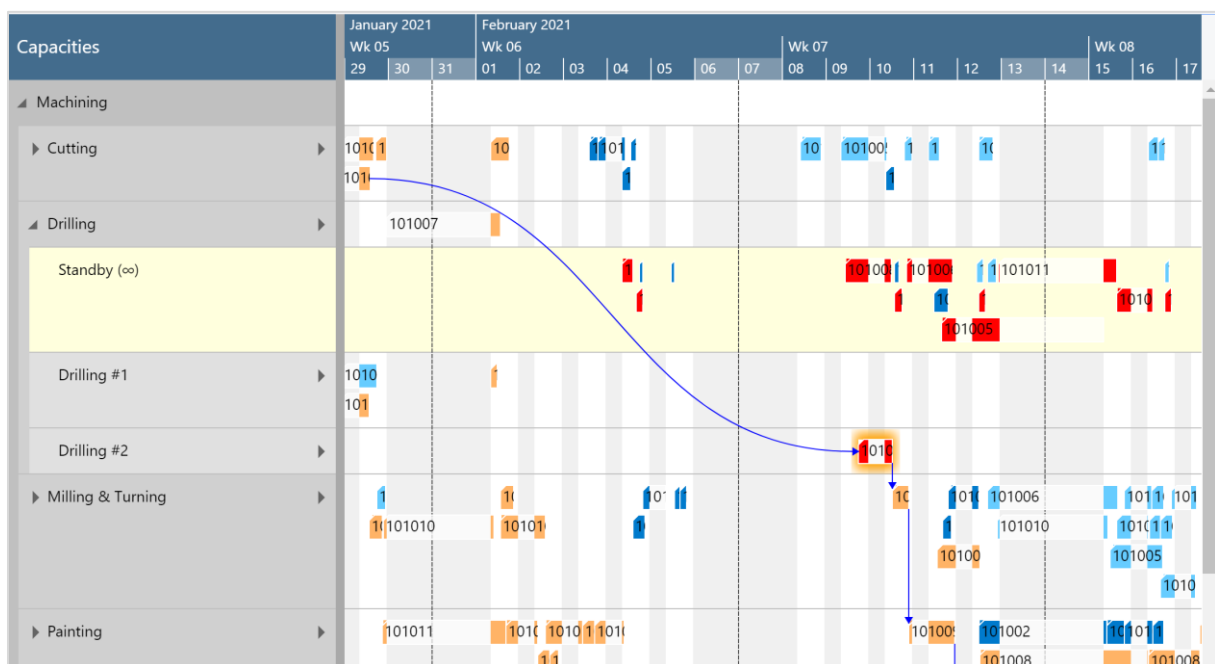
If, for some reasons, you want to highlight one or more specific machine/work centers, you can do so by changing their individual color on the respective machine/work center card:

General	
No. ....	<input type="text" value="110"/> ...
Name .....	Cutting #1
Work Center No. ....	100
Search Name .....	CUTTING #1
Blocked .....	<input type="checkbox"/>
Last Date Modified .....	9/3/2019
Color (VAPS) .....	<input type="text" value=""/>

### Example

The below screenshot shows a production schedule with the Machine/Work Center View applied. The following settings are used:

- Default machine/work center color = by production order status
- Machine center color for machine center "drilling #2" = red



### 4.3. What does the Production Order View (color mode) show?

The Production Order View helps you to focus on certain production orders. It highlights production orders that you want to visually stand out. For that reason, you can define a default production order color in the color setup and production order-specific colors on the production order card.

**The Production Order View is useful to recognize certain production orders at a glance. This could be the case, e.g., if your orders are typically both make-to-order as well as make-to-stock. Then, if things get tight because a deadline approaches and you need to shift out some order, you might want to shift out your stock orders, because with them, there is usually more time**

**flexibility. If you have defined a unique color for your stock orders you can quickly and easily recognize them.**

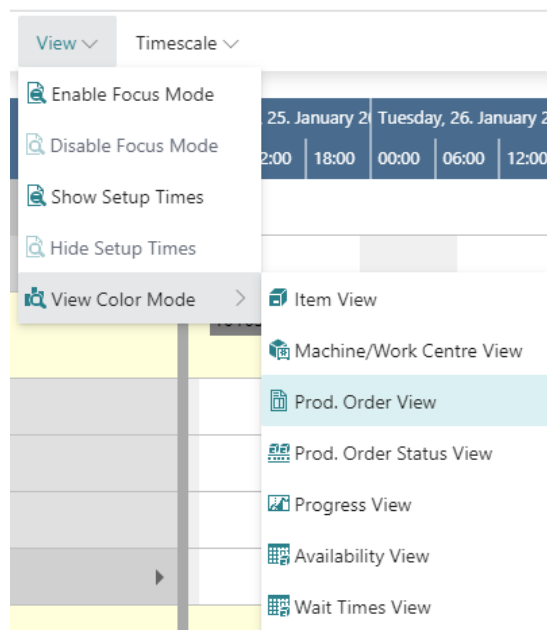
#### 4.3.1. How to apply the Production Order View

You can apply the Production Order View in two ways:

1. On the "production simulations" page, you can choose it under "default view color type":

<span>Search</span> <span>Edit List</span> <span>Delete</span> <span>EMAD Allocations</span> <span>Create Simulation</span> <span>View Simulation</span>					
Description		Default View Color Type		Invalid	Outdated
	Simulation Created on 06/30/20 09:13 AM		Production Order View	<input type="checkbox"/>	<input type="checkbox"/>
	Simulation Created on 06/30/20 09:42 AM		Production Order View	<input type="checkbox"/>	<input type="checkbox"/>

2. When you are in the visual schedule, you can select Actions --> View Color Mode --> Production Order View:



**Important to know: the production order color is applied to an entire production order (line).**

#### 4.3.2. Change default colors

Of course, you can adjust the default colors being used for production orders when the Production Order View is applied to your individual needs. This can be done in the "General" area in the "Color Setup" - the below picture showing the default production order color coming with the VAPS:

General			
Default Item Color	#0008ff	Default Production O...	#0008ff blue
Default Machine/Wor...	#0008ff	Setup Time Color	d0d0e1

### 4.3.3. Change color for an individual production order

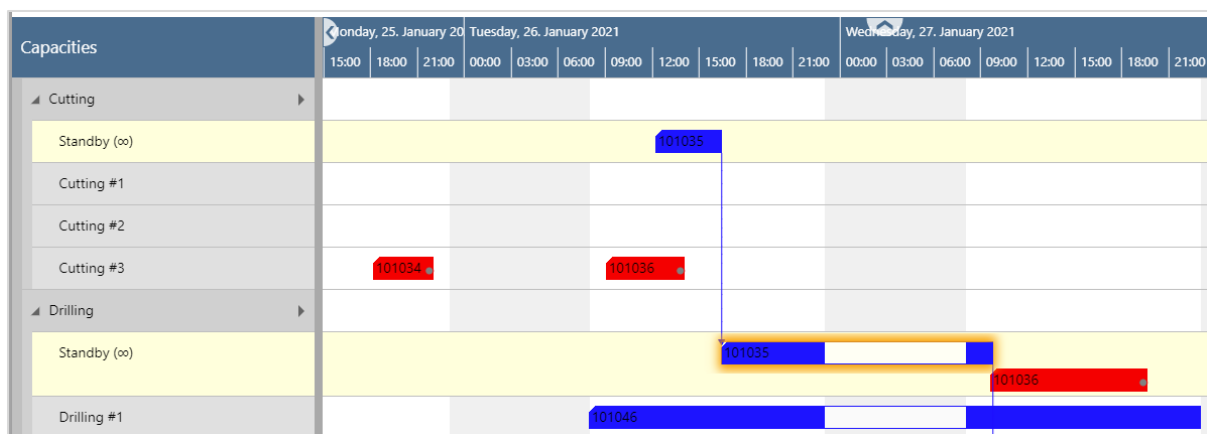
If you want to highlight one or more production orders in your plan, because, perhaps, they are urgent or belong to quite important customers, you can change the color on the Production Order Card:

General	
No.	101046
Description	1 Operation Simple
Description 2	
Source Type	Item
Source No.	3000
Search Description	1 OPERATION SIMPLE
Quantity	180
Due Date	1/28/2021
Required Due Date	1/28/2021
Assigned User ID	
Blocked	<input type="checkbox"/>
Last Date Modified	4/16/2020
Color (VAPS)	

### Example

The below screenshot shows a production schedule with the Production Order View applied. The following settings are used:

- Default production order color = blue
- Production order color for orders no. 101034 and 101036 = red





#### 4.4. What does the Production Order Status View (color mode) show?

The Production Order Status View helps you to quickly see where in your scheduling & execution process your production orders are. It differentiates production orders by their respective status and lets you define different colors for the following statuses:

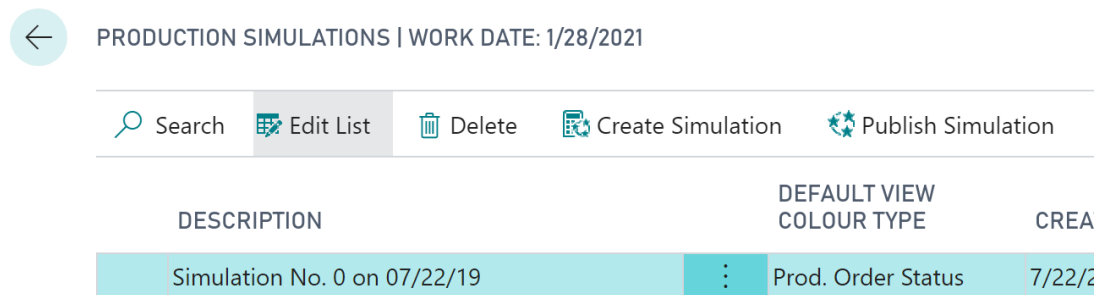
- Planned
- Firm planned
- Released

**The Production Order Status View is particularly useful if you want to quickly see where in your scheduling & execution process your production orders are.**

##### 4.4.1. How to apply the Production Order Status View

The Production Order Status View can be applied in two ways:

1. On the "production simulations" page, you can choose it at "default view color type":

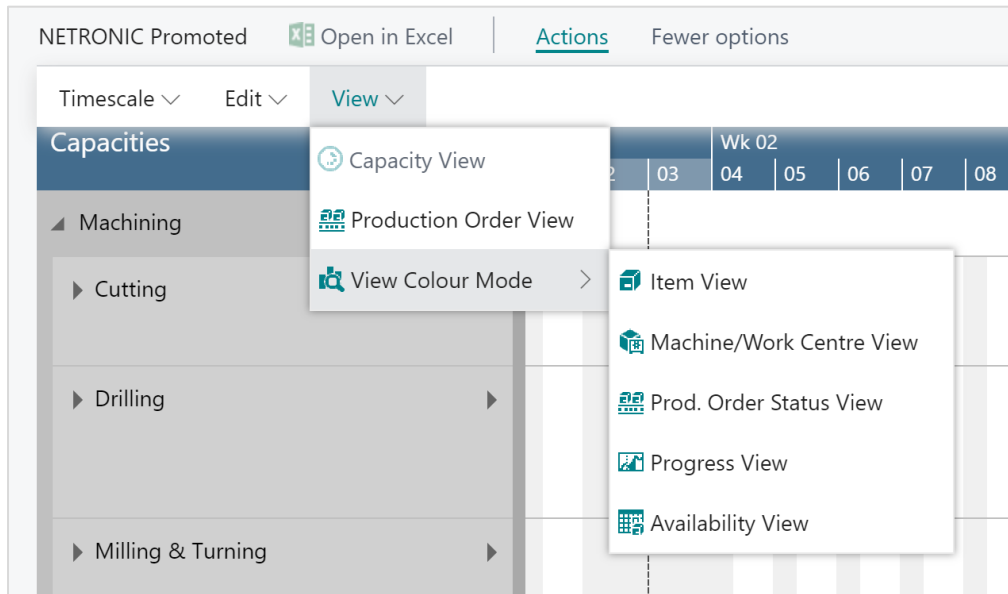


← PRODUCTION SIMULATIONS | WORK DATE: 1/28/2021

Search Edit List Delete Create Simulation Publish Simulation

DESCRIPTION		DEFAULT VIEW COLOUR TYPE	CREA
Simulation No. 0 on 07/22/19	⋮	Prod. Order Status	7/22/2

2. When you are in the visual schedule, you can select Actions --> View Color Mode --> Prod. Order Status View:



**Important to know: the production order status color is applied to an entire production order.**

#### 4.4.2. Change default colors

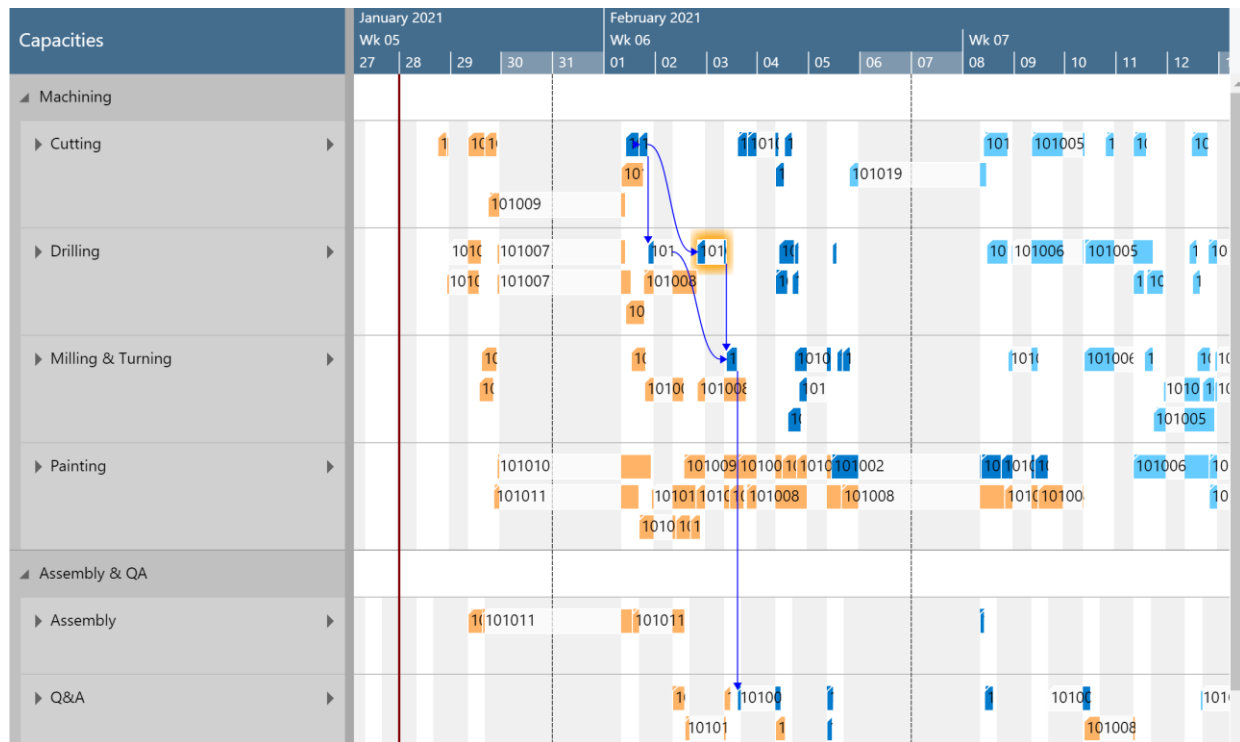
Of course, you can adjust the default colors that are used when the Production Order Status View is applied to your individual needs. This can be done in the according area in the "Color Setup".

The picture below shows the default colors coming with the VAPS.

Production Status			
Planned Production ...	#66ccff	light blue	Released Order . . . . .
Firm Planned Order . . . .	#007acc	dark blue	#ffb366
			orange

### Example

The below screenshot shows a production schedule with the Production Order Status View applied with the default colors coming with the VAPS.



#### 4.5. What does the Progress View (color mode) show?

The Progress View helps you to quickly see which productions are late. This is both with respect to production orders that start late and those that finish late. It differentiates production orders by their lateness and lets you define different colors for the following statuses:

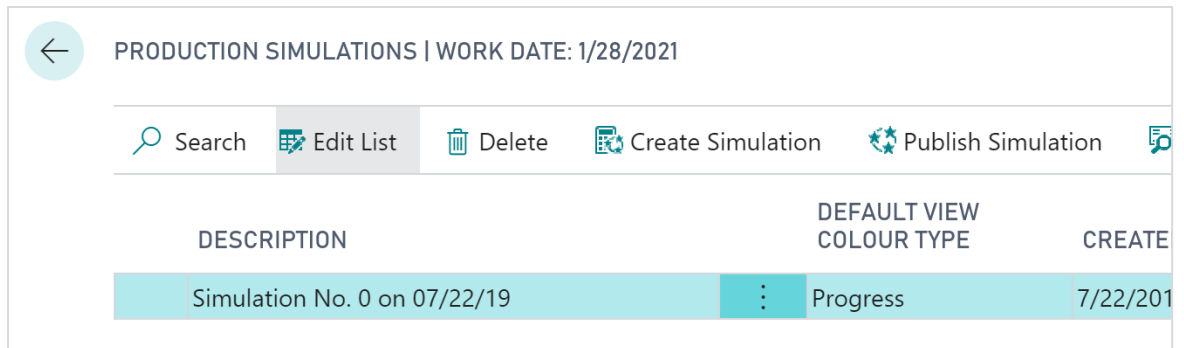
- Progress status **missed**. It indicates production orders that are planned to finish past a requested date. Hence, this is the default color that is used if the end date of an operation is past the required due date.
- Progress status **not started**. It indicates production orders that should have been started by now, but are not. Hence, this is the default color that is used if the start date of a planned operation is before the current date/time.
- Progress status **OK**. It indicates those production orders that neither start nor finish too late. Hence, this is the default color that is used if none of the above mentioned two colors get applied.

The Production Order Status View is particularly useful if you want to quickly see if you are running late.

#### 4.5.1. How to apply the Progress view

The Progress View can be applied in two ways:

1. On the "production simulations" page, you can choose it at "default view color type":

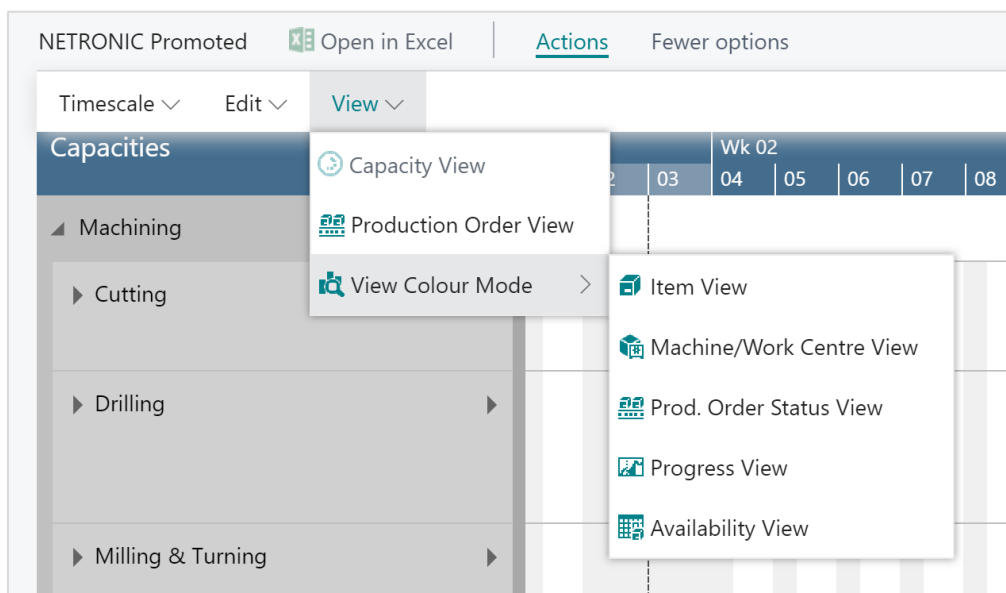


PRODUCTION SIMULATIONS | WORK DATE: 1/28/2021

Search Edit List Delete Create Simulation Publish Simulation

DESCRIPTION	DEFAULT VIEW COLOUR TYPE	CREATE
Simulation No. 0 on 07/22/19	Progress	7/22/201

2. When you are in the visual schedule, you can select Actions --> View Color Mode -->Progress View:



**Important to know: the progress status color is applied to an entire production order.**

#### 4.5.2. Change default colors

Of course, you can adjust the default colors being used for the progress status when the Progress View is applied, to your individual needs This can be done in the according area in the "Color Setup" - the below picture showing the default progress status colors coming with the VAPS:

### Progress Status

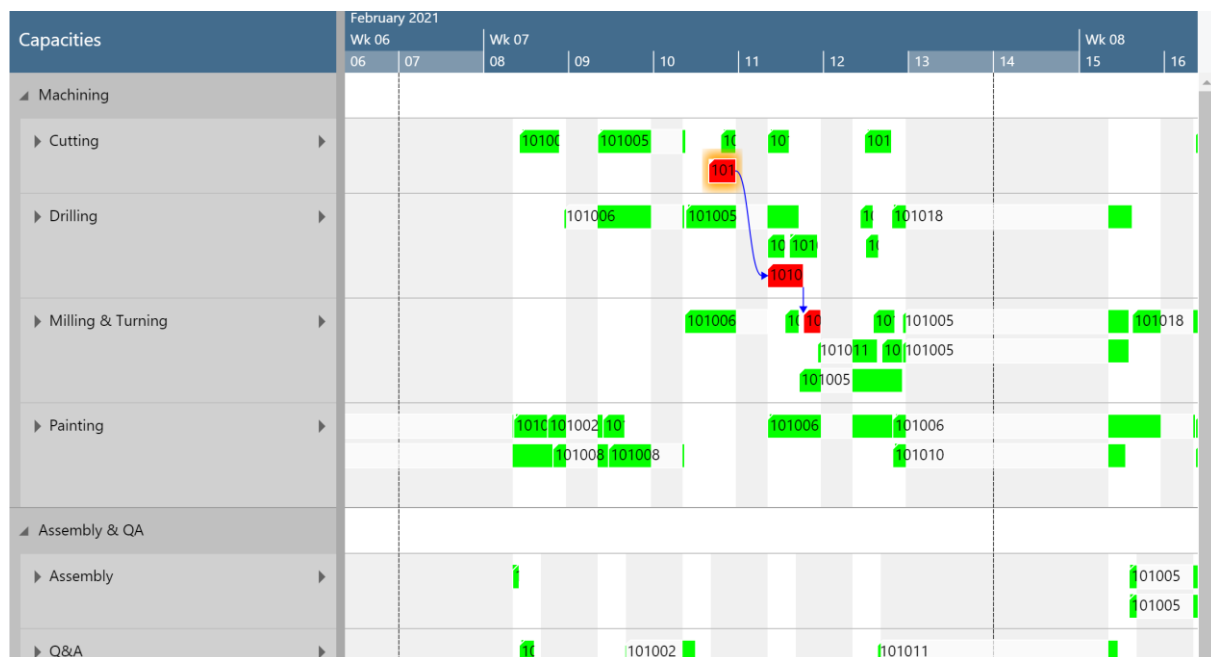
Progress Status Missed · #ff0000 **red** ...

Progress Status Ok · · · · · #04ff00 **green** ...

Progress Status Not S... · #ff9100 **orange** ...

## Example

The below screenshot shows a production schedule with the Progress View applied and using the default colors coming with the VAPS:



## 4.6. What does the Availability View (color mode) show?

The Availability View helps you to focus on the material availability of your production orders. It lets you see which production orders have or don't have the needed material when the first operation is meant to start.

**The Availability is useful to recognize the material availability of your production orders at a glance.**

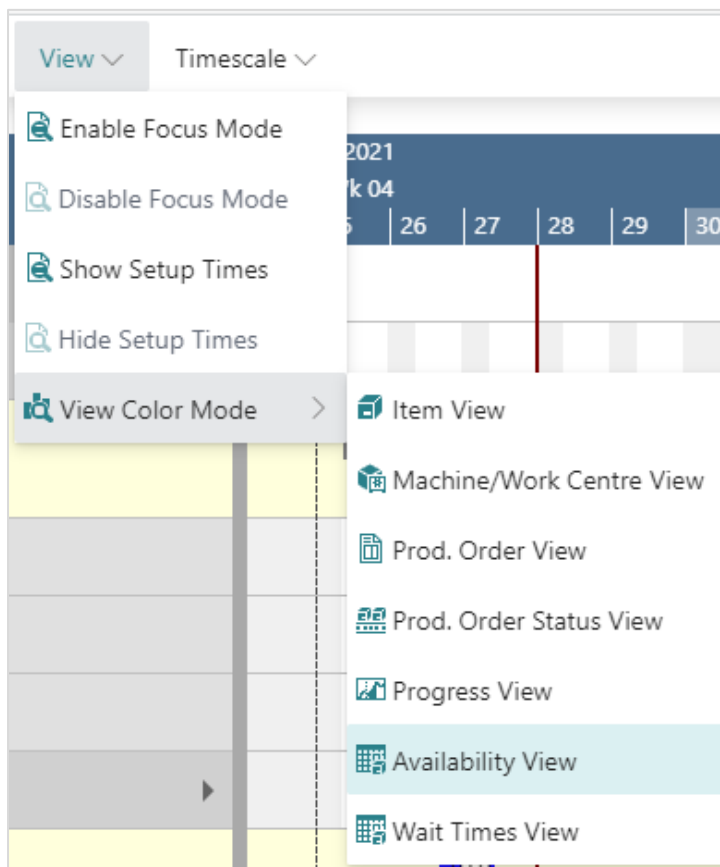
### 4.6.1. How to apply the Availability View

You can apply the Availability View in two ways:

1. On the "production simulations" page, you can choose it under "default view color type":

Description		Default View Color Type
→ Simulation Created on 06/30/20 09:13 AM	⋮	Availability ▼
Simulation Created on 06/30/20 09:42 AM		Production Order View

2. When you are in the visual schedule, you can select Actions --> View Color Mode --> Availability View:

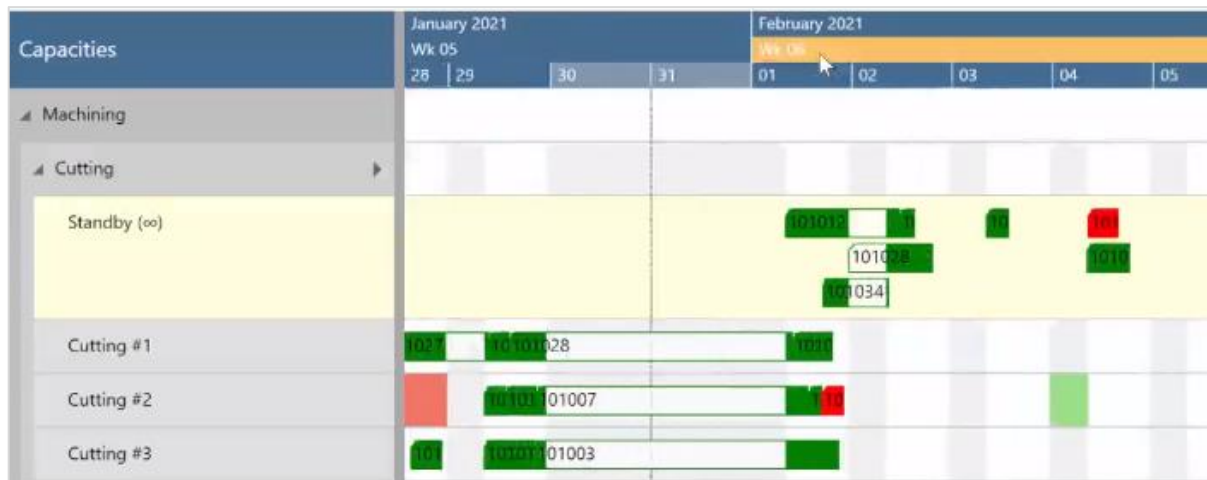


**Important to know: the availability color is applied to an entire production order (line).**

The below screenshot shows a production schedule with the Availability View applied. The default settings are:

- production orders where the material is available = green

- production orders that are scheduled before the required material is available = red



#### 4.6.2. Change default colors

Of course, you can adjust the default colors that are used when you apply the Availability View to your individual needs this can be done in the according area in the "Color Setup":

Material Availability	
Material Available . . . . .	#008000
Material Not Available . .	#ff0000

#### 4.7. What does the Wait Times View (color mode) show?

The Wait Times View helps you to recognize bottlenecks quickly and gives you an overview of critical and uncritical waiting times of operations at the machines.

**The idea behind this view: operations might need to wait for other operations to finish as the other operations have (an implicit) higher priority.**

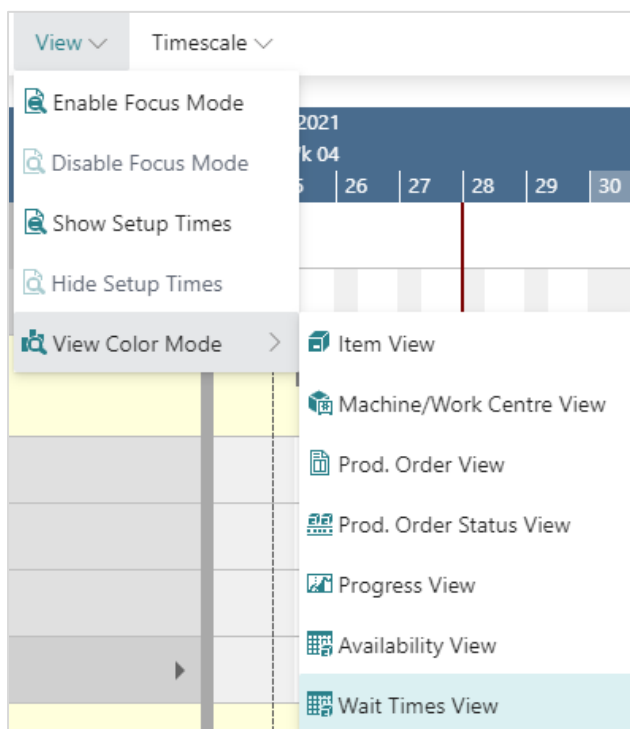
##### 4.7.1. How to apply the Wait Times View

You can apply the Wait Times View in two ways:

1. On the "production simulations" page, you can choose it under "default view color type":

Description	Default View Color Type
→ Simulation Created on 06/30/20 09:13 AM	Wait Times
Simulation Created on 06/30/20 09:42 AM	Production Order View

2. When you are in the visual schedule, you can select Actions --> View Color Mode --> Wait Times View:

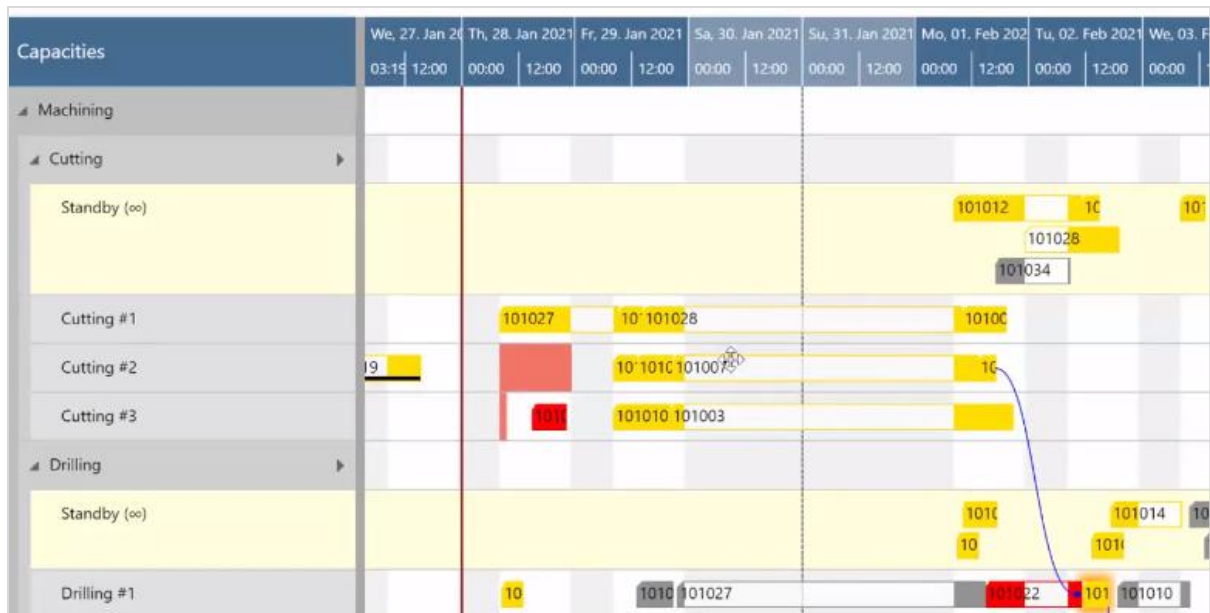


**Important to know: the wait times color is applied to an entire production order (line).**

The below screenshot shows a production schedule with the Wait Times View applied. The default settings are:

- no waiting times = grey
- waiting times, but the production order finishes in time = orange
- waiting time and part of a late production order = red





#### 4.8. What does the MRP View (color mode) show?

The MRP View helps you to quickly differentiate production orders that belong to the VAPS area of responsibility from those that belong to the MRP area of responsibility.

**The MRP view lets you recognize production orders that are not touched by the planning worksheet since they belong into the VAPS area of responsibility.**

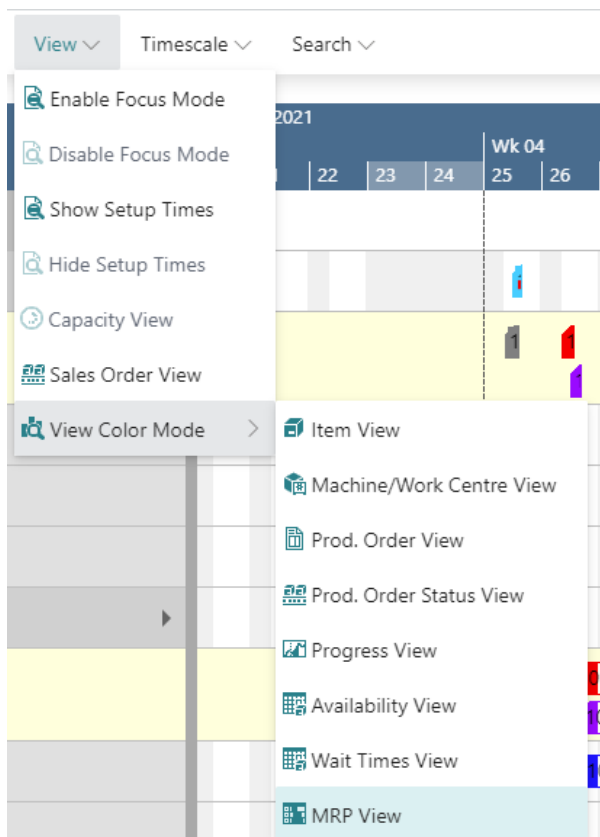
#### 4.8.1. How to apply the MRP View

You can apply the MRP View in two ways:

1. On the "production simulations" page, you can choose it under "default view color type":

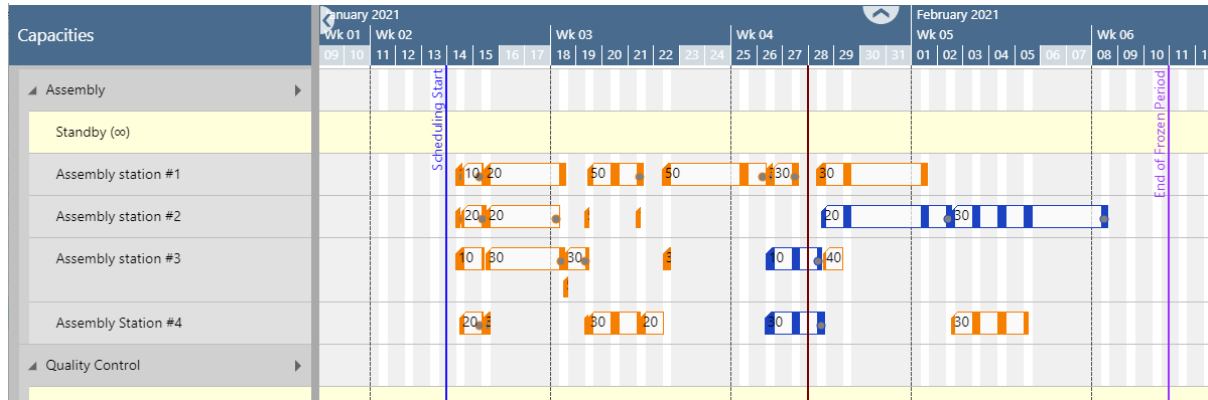
Description		Default View Color Type	Invalid
→ Simulation Created on 06/30/20 09:13 AM	:	Wait Times	<input type="checkbox"/>
Simulation Created on 06/30/20 09:42 AM		Item View	<input type="checkbox"/>
Simulation Created on 06/30/20 12:57 PM		Machine/Work Centre View	<input type="checkbox"/>
Simulation Created on 07/06/20 02:18 PM		Prod. Order Status	<input type="checkbox"/>
Simulation Created on 07/06/20 02:45 PM		Progress	<input type="checkbox"/>
Simulation Created on 09/15/20 11:22 AM		Availability	<input type="checkbox"/>
Simulation Created on 09/17/20 11:40 AM		Wait Times	<input type="checkbox"/>
Simulation Created on 09/22/20 01:35 PM		Production Order View	<input type="checkbox"/>
		MRP View	<input type="checkbox"/>
		Prod. Order Status	<input type="checkbox"/>
		Prod. Order Status	<input type="checkbox"/>

2. When you are in the visual schedule, you can select Actions --> View Color Mode --> MRP View:

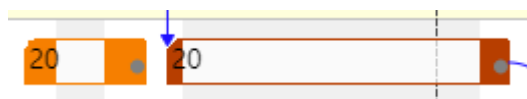


**Important to know: MRP color is applied to an entire production order (line).**

The below screenshot shows a production schedule with the MRP View applied. The orders planned by the VAPS appear in orange, the ones planned by MRP in blue.



The darker red shows that for this production order you have set an exception to the standard rule by context menu



## 5. Setting up the VAPS

### 5.1. How can I define the default colors?

Define default colors at one central page so that you can quickly apply different color schemes in the planning board.

The Visual Advanced Production Scheduler allows you to quickly change the coloring in the planning board. This enables you to focus on different kinds of information at one glance - quicker. Overall, we support the following color schemes:

- Item view
- Machine/ work center view
- Production order view
- Production order status view
- Progress view
- Availability view
- Wait times view

All these color schemes are based on default colors. You can define them on the "color setup" page, which you can access from the NETRONIC VAPS menu, or by simply searching for "color setup". The color setup page looks as follows:

✓ SAVED

## Colour Setup

Show Attached

### General

Default Item Colour	#0008ff	Progress Status Not Satisfied	#ff9100
Default Machine/Work Center Colour	#0008ff	Progress Status Ok	#04ff00
Progress Status Missed	#ff0000		

### Production

Planned Production Order Colour	#66ccff	Released Order	#ffb366
Firm Planned Order	#007acc		

#### 5.1.1. General information

You can define colors either by its hex value or by clicking the three dots in each color-related line. This opens a color picker.

All colors that you define here are always only applied to the bars in the planning board. Hence, these colors are used to determine the color or a production order routing line (operation) in the planning board.

#### 5.1.2. Specific settings and what they are for

Let's look at all the settings that you can make in more detail.

##### General

- **Default item color:** This is relevant for the **Item View**. This is the color in which every bar is shown in the Item View. If you want to focus on certain items, you have to define item-specific colors on the item page.
- **Default machine/ work center color:** This is relevant for the **Machine/ Work Center View**. This is the color in which every bar is shown in the Machine/ Work Center View. If you want to focus on certain machines, you have to define machine-specific colors on the machine center (or work center) page.
- **Default production order color:** This is the color in which every bar is shown in the Production Order View. If you want to focus on certain production orders, you have to define production order-specific colors on the production order page.

- **Setup time color:** The color being used for the small rectangle at the beginning of the bar that visualizes setup times of an operation.

### Progress status

These colors are relevant for the **Progress View**.

- Progress status **missed**: Indicates production orders that are planned to finish past a requested date. Hence, this is the default color that is used if the end date of an operation is past the required due date. The required due date is a new data field provided by the VAPS. It is fixed, and will not be changed by any Business Central scheduling run. The "progress status missed" color will be applied to all operations of a production order of which a minimum of one operation ends past the required due date.
- Progress status **not started**: Indicates production orders that should have been started by now, but are not. Hence, this is the default color that is used if the start date of a planned operation is before the current date/time. The "progress status not started" color will be applied to all operations of a production order of which a minimum of one operation ends past the required due date.
- Progress status **OK**: Indicates those production orders that neither start nor finish too late. Hence, this is the default color that is used if none of the above mentioned two colors get applied.

### Production Order Status

These colors are relevant for the **Production Order Status View**.

- **Planned** order: Defines the color in which all planned production orders are shown.
- **Firm planned** order: Defines the color in which all firm planned production orders are shown.
- **Released** order: Defines the color in which all released production orders are shown.

### Material Availability

These colors are relevant for the **Availability View**.

- Material **available**: Defines the color in which production orders are shown when the material is available.
- Material **not available**: Defines the color in which production orders are shown when the material is not available.

### Waiting Times

These colors are relevant for the **Wait Times View**.

- **Due date warning**: Defines the color in which production orders are shown that have operations that need to wait AND the production order runs late.
- **Wait time warning**: Defines the color in which production orders are shown that have operations that need to wait, but the production order finishes in time.
- **Wait time default**: Defines the color in which production orders are shown that have no waiting times.

**Work center**

- **Subcontract work center color:** Defines the default color for subcontract work centers.

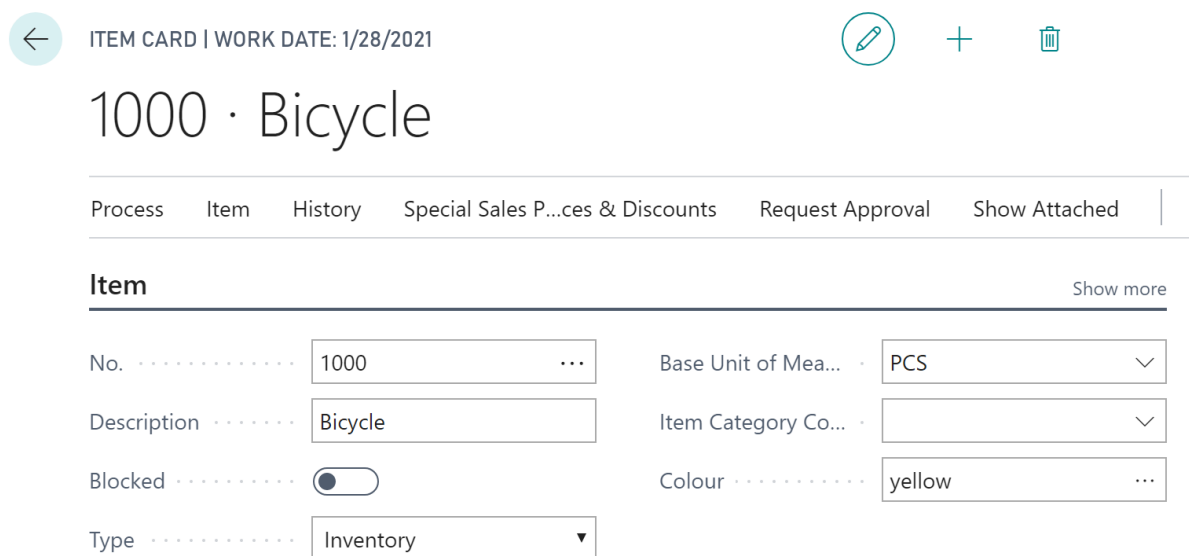
**5.2. How can I define individual colors for specific items?**

Define item colors on the item card. This helps you to make production orders visually stand out in the "Item View".

You can make production orders visually stand out in the Item View. That means you can define specific colors for specific items that you do not want to be shown in the default item color.

You can do this from the item card. We added a color field to the item header.

You can either type in the color's name:



ITEM CARD | WORK DATE: 1/28/2021

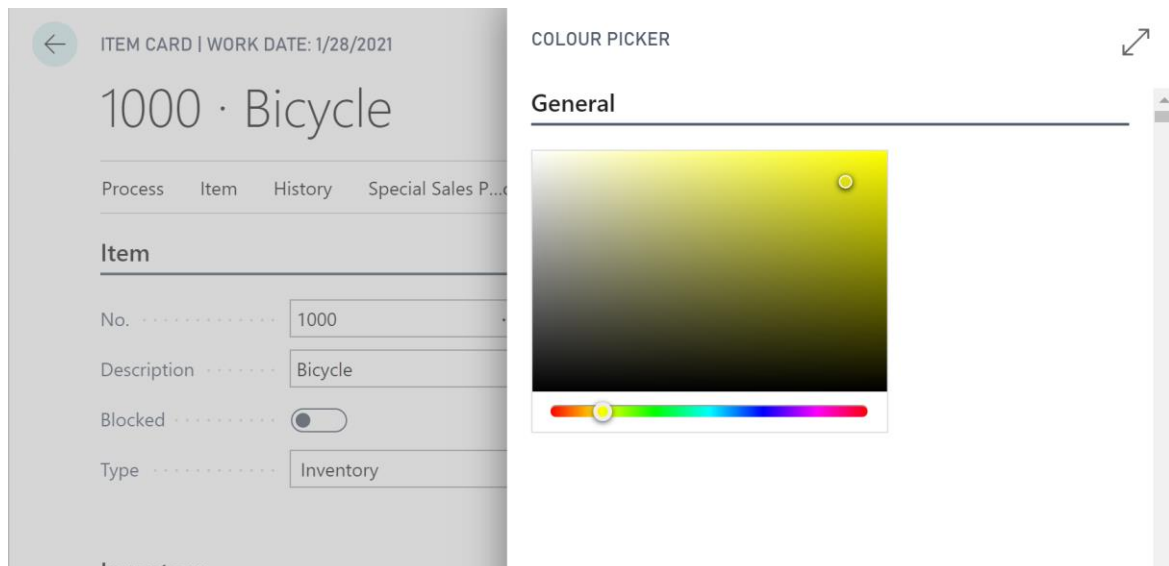
1000 · Bicycle

Process   Item   History   Special Sales P...ces & Discounts   Request Approval   Show Attached

**Item** Show more

No. ....	1000 ...	Base Unit of Mea...	PCS ▾
Description .....	Bicycle	Item Category Co...	▾
Blocked .....	<input checked="" type="checkbox"/>	Colour .....	yellow ...
Type .....	Inventory ▾		

Or you can specify and color via color picker if you click the three dots at the end of the color field:



This populates the color field with the respective hex code (you also can type in the hex code directly if you know it):

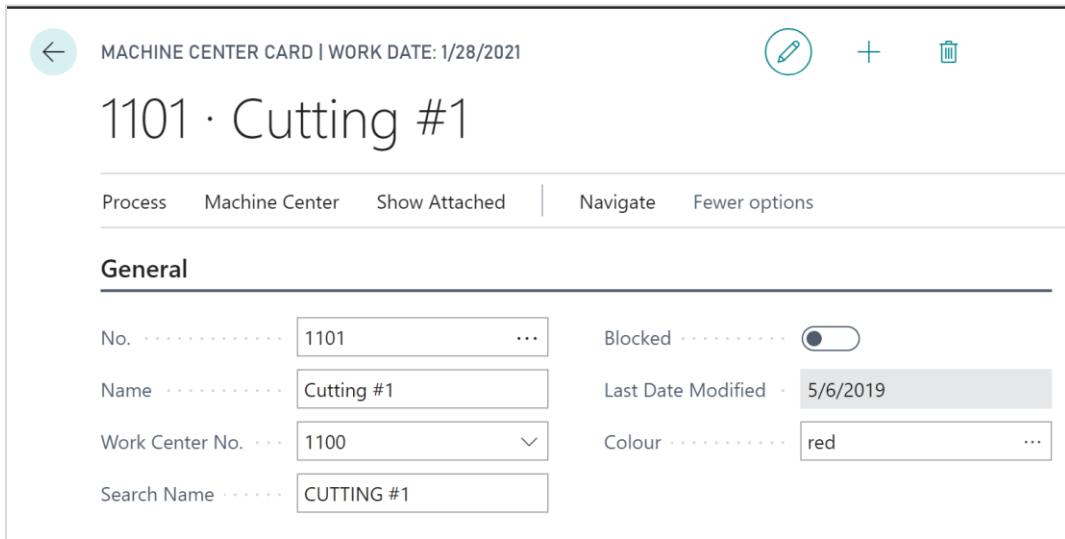
 The image shows the 'ITEM CARD' interface for '1000 · Bicycle' with the 'Item' tab selected. The card has a back arrow, a title 'ITEM CARD | WORK DATE: 1/28/2021', and action icons (edit, add, delete). The 'Item' tab is active, showing fields for 'No.' (1000), 'Description' (Bicycle), 'Blocked' (toggle), and 'Type' (Inventory). There are also fields for 'Base Unit of Mea...' (PCS), 'Item Category Co...' (dropdown), and 'Colour' (#dede1a). A 'Show more' link is visible at the bottom right.

### 5.3. How can I define individual colors for specific machine centers?

You can make production orders visually stand out in the Machine/ Work Center View. That means you can define specific colors for specific machine and/or work centers that you do not want to be shown in the default item color. If an operation is assigned to that machine/work center, it will be shown in the color you select for it.

You can do this from the machine/ work center card. We added a color field to the machine/work center header.

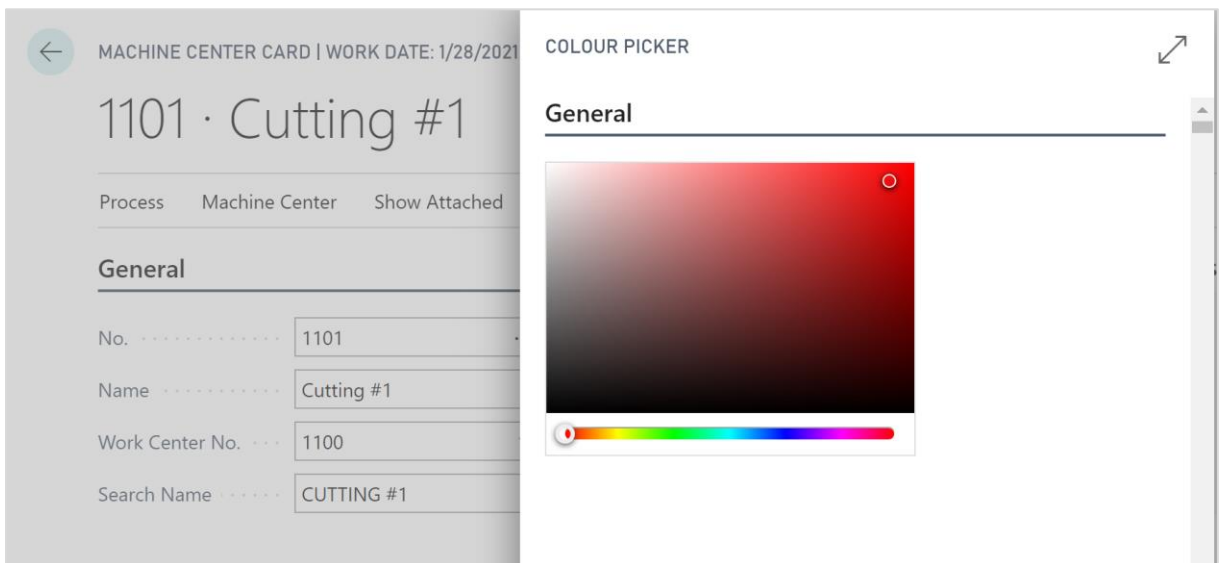
- You can either type in the color's name:



The screenshot shows a 'MACHINE CENTER CARD' for '1101 · Cutting #1' with a work date of 1/28/2021. The card has a header with a back arrow, title, and edit/delete icons. Below the header is a navigation bar with 'Process', 'Machine Center', 'Show Attached', 'Navigate', and 'Fewer options'. The 'General' section contains the following fields:

No.	1101	Blocked	<input checked="" type="checkbox"/>
Name	Cutting #1	Last Date Modified	5/6/2019
Work Center No.	1100	Colour	red
Search Name	CUTTING #1		

- Or you can specify and color via color picker if you click the three dots at the end of the color field:



The screenshot shows the same 'MACHINE CENTER CARD' as before, but with the 'COLOUR PICKER' dialog open. The dialog has a 'General' section with a color selection area (a square with a gradient from black to red) and a color bar below it. The color bar shows a spectrum of colors from red to blue. The color field in the card is now set to a darker shade of red.

This populates the color field with the respective hex code (you also can type in the hex code directly if you know it):



← MACHINE CENTER CARD | WORK DATE: 1/28/2021

1101 · Cutting #1

Process Machine Center Show Attached | Navigate Fewer options

**General**

No. .... 1101 ... Blocked ..... ☒

Name .... Cutting #1 Last Date Modified · 5/6/2019

Work Center No. .... 1100 ... Colour ..... #ed1010 ...

Search Name ..... CUTTING #1

#### 5.4. How can I define individual colors for specific production orders?

If you want to highlight certain production orders you can define specific colors for specific production orders that you do not want to be shown in the default item color.

This is done on the production order card where we added a color field to the production order header.

Specify the color by either

- Entering the color's name

← FIRM PLANNED PROD. ORDER | WORK DATE: 1/28/2021

101035 · 3 Operations Subcontracting in Middle as Alternative

Process Order | More options

**General**

No. .... 101035 ... Quantity ..... 25

Description ..... 3 Operations Subcontracting in Middle as Alternative Due Date ..... 1/28/2021

Description 2 ..... Required Due Date ..... 1/28/2021

Source Type ..... Item Assigned User ID .....

Source No. .... 3006 ... Last Date Modified ..... 4/16/2020

Search Description ..... 3 OPERATIONS SUBCONTRACTING IN MIDDLE AS ALTEF Color (VAPS) ..... purple ...

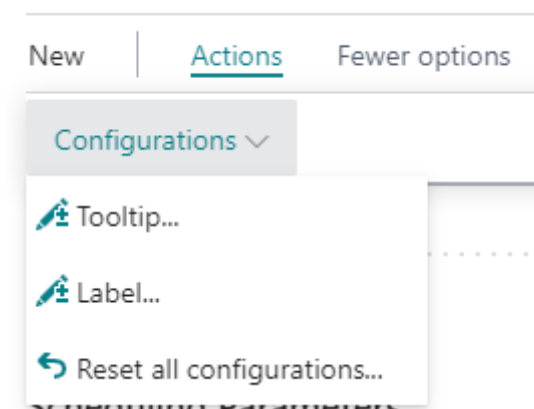
- Clicking on ... in the color field and select the color via color picker - the color's respective hex code will be entered.
- Type in the hex code.

## 5.5. How to configure tooltips

The tooltips of the VAPS provide further information on the following items of your production schedule:

<u>Machine Center</u>
Production Order Line
Operations
Sales Order Status
Sales Order Number
Sales Line Item Number
Sales Line Item Number
Work Center Group
Work Center

You can specify which information is to be shown in the tooltip of the respective item in the "Tooltip" dialog - to be reached by clicking "Configurations" in the "Actions" menu of the "VAPS Setup" dialog:



In the dialog popping up, you select the item for which you want to customize the tooltip and then either delete, edit or add fields and then click the "Edit" item from the "Actions" menu:

VIEW - SELECT TOOLTIP

Description

Machine Center

Production Order Line

Operations

Sales Order Status

Sales Order Number

Sales Line Item Number

Sales Line Item Number

Work Center Group

Work Center

Close

The dialog “Edit – Define configuration” pops up.

EDIT - DEFINE CONFIGURATION

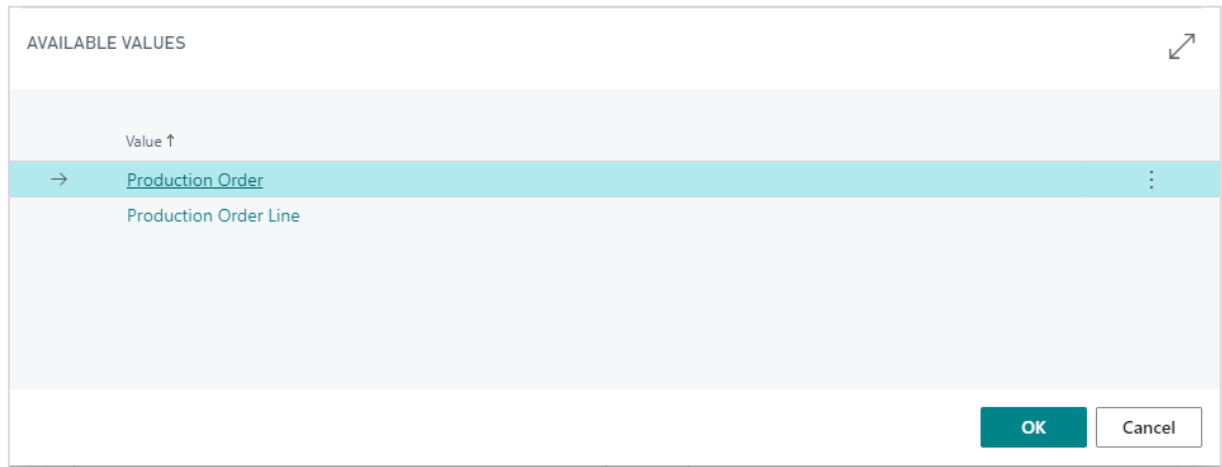
Production Order Line


Table Name	Field Name
Production Order Line	Status
Production Order Line	Description
Production Order Line	Prod. Order No.
Production Order Line	Line No.
Production Order Line	Starting Date-Time
Production Order Line	Ending Date-Time
Production Order Line	Due Date
Production Order Line	Routing No.
Production Order Line	Quantity (Base)
→ Production Order Line	Routing Reference No.

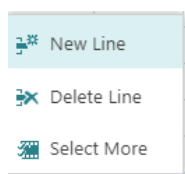
Close

Here you can:

- Add a new field:  
either click +NEW or just click in the last row. You can select the desired Dynamics 365 BC data by clicking “...” either for table and field name.



- Insert a new field:  
Select the field above which you want to insert a new one and proceed as described above.
- Delete a field:  
Click  and select "Delete line"



## 5.6. How to configure bar labels

You can decide which D365 BC information is to be shown as bar label.

Bar labels are shown on

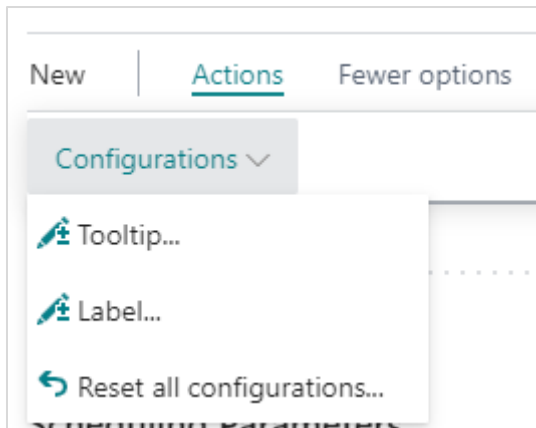
- operations in the Production View
- operations in the Capacity View

In the picture below, you see the bar label of a production order line in the Sales View, showing

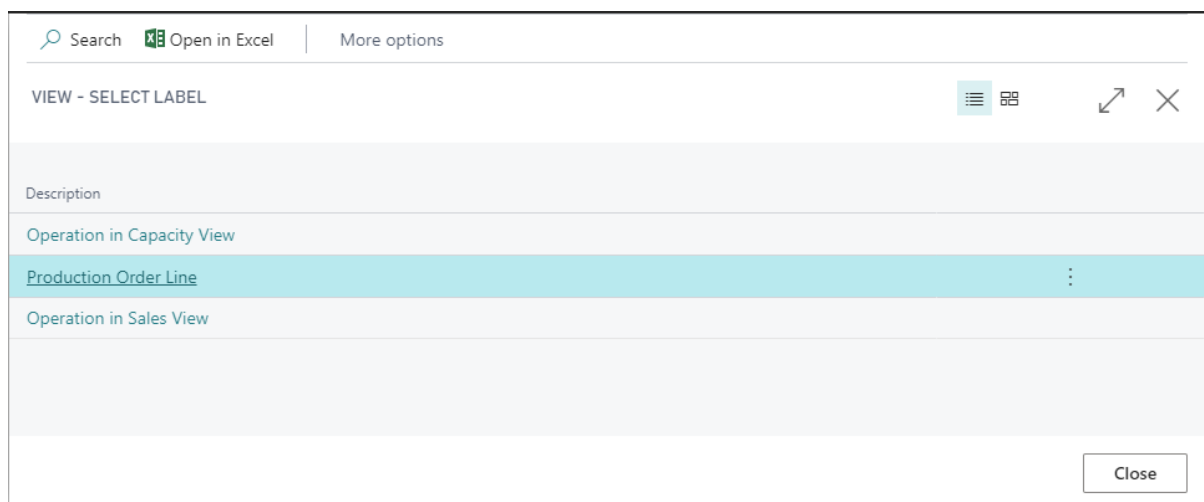
- the production order number
- the number of the production order line
- the quantity



You can specify which information is to be shown on the bar label of the respective item in the according dialog to be reached by clicking "Configurations" in the "Actions" menu of the "Setup" dialog:



- In the "View - select label" dialog, select the item and/or view for which you want to customize the bar label - in our case "Production Order Line":



- The "Edit – Define Configuration" dialog pops up:

Search + New Edit List Delete Move Up Move Down Open in Excel

EDIT - DEFINE CONFIGURATION

Production Order Line

Table Name	Field Name
Production Order Line	Prod. Order No.
VAPS Format Strings	
Production Order Line	Line No.
VAPS Format Strings	
→ Production Order Line ...	Quantity (Base)

Close

- Here you can add, insert, edit, and delete fields as well as change their order. You can select the desired table name and field name from your Dynamics 365 BC data by clicking “...”

Search Open in Excel

AVAILABLE VALUES

Value ↑
Machine Center
Production Order
Production Order Line
Production Order Routing Line
→ VAPS Format Strings ...
Work Center

OK Cancel

### 5.6.1. Formatting the labels

Separate the field contents in the table label by a line break, a blank or other separators by selecting the according separator from the "VAPS Format Strings" table.

#### AVAILABLE VALUES

Value
New Line
Space
:
(
→ )

### 5.7. How can I define alternative routings/ alternative machine centers?

You might have machines that can do the same job. With the alternate routing sets, you can define these alternative machines. Plus: you can also define production (and setup!) coefficients if some machines can run faster than the others.

You can define alternative routings/ alternative machine centers on the "alternate routing set" page, which you can access from the NETRONIC VAPS menu, or by simply searching for "alternate routing set". The alternate routing set setup page looks as follows:

←
✎ + 🗑
✓ SAVED ↗

## Alternate Routing Set

---

Show Attached

---

Header

No. ....

Description .....

Version No. ....

Blocked ..... ☐

---

Alternate Routing Lines ▾

NO.	MACHINE CENTER NO.	MACHINE CENTER NAME	SETUP TIME MULTIPLIER	RUN TIME MULTIPLIER
			1.00	1.00

You then can create a new alternative routing set by clicking the "+" icon which you find at the top of the page. Then you need to give your routing set a unique number:

←
✎ + 🗑
↗

## Alternate Routing Set

---

Show Attached

---

Header

No. .... Set#1 - Cutting

Description .....

Version No. .... ▼

Blocked ..... ☐

After that, you can add all those machine and/or work centers to the alternate routing set that can work as alternative resources within one routing.

However, you not just define the respective alternative resources. **In addition to this you can also define two different types of production coefficients:**

- The setup multiplier
- The runtime multiplier



←


✓ SAVED

## Alternate Routing Set

---

Show Attached

---

**Header**

No. .... SET#1 - CUTTING

Description .....

Version No. .... ▼

Blocked ..... ☒

---

Alternate Routing Lines ▼

MACHINE CENTER NO.	MACHINE CENTER NAME	SETUP TIME MULTIPLIER	RUN TIME MULTIPLIER
1101	Cutting #1	1.00	1.00
1102	Cutting #2	1.25	0.80
1103	Cutting #3	0.80	2.00

In the above example, the alternate routing set "SET#1 - CUTTING" determines the following:

1. The machine centers 1101, 1102 and 1103 (cutting #1, cutting #2, and cutting #3) are alternative machines.
2. The machine center cutting #1 is the reference machine (both setup time multiplier and run time multiplier equal 1).
3. Cutting #2 takes 25% longer to set-up than cutting #1 but can run 20% faster (only takes 80% of the run time).
4. Cutting #3 can be set-up 20% faster than cutting #1 but runs 2x longer.

Once you defined an alternate routing set, you can add it to any routing that you have.

ROUTING | WORK DATE: 1/28/2021

+

✓ SAVED

## 1300 · Frame

Copy Routing...
Versions
Where-used
Show Attached
Page
Actions
Navigate
Report
Fewer options

### General

No.
1300

Search Description
FRAME

Description
Frame

Version Nos.

Type
Serial

Active Version

Status
Certified

Last Date Modified
7/20/2019

Lines
Manage
Operation
Fewer options

OPERATI... NO.	PREVIOUS OPERATI... NO.	NEXT OPERATI... NO.	TYPE	NO.	DESCRIPTION	ALTERNAT... SET	SE... DE... SE...	SETUP TIME	RUN TIMI
10		20	Machine Cent	1101	Cutting #1	SET#1 - CUTT...	<input type="checkbox"/>	60	1
20	10	30	Machine Ce...	1202	Drilling #2		<input type="checkbox"/>	30	1
30	20	40	Machine Ce...	1303	Mill & Turn		<input type="checkbox"/>	120	1
40	30		Work Center	2200	Q&A		<input type="checkbox"/>	0	

The above example shows the routing 1300 for the item frame. Operation 10 by default is assigned to machine center 1101 (cutting #1). However, you see that the "SET#1 - CUTTING" is also defined as the alternate set.

When you now create a new production order using this routing, and when you then (re)calculate the production order via the standard Business Central scheduling, the alternate set is added to the production order routing line of that production order.

As a consequence, all alternative machine centers will get highlighted when you drag operation 10 of the routing in the planning board. Also, when you reassign it from cutting #1 to one of the alternative machine centers, the setup time multiplier and the runtime multiplier will get taken into account.

## 5.8. How to set the parameters for EMAD calculation

When you want to setup an EMAD (= Earliest Material Availability Date) calculation, you need two settings:

1. Define the "Look ahead window" i.e. specify how far from now (= today) you would like to make the allocation of component supply to component demand. This is done in the "VAPS Setup":

Playground - All | Finance | Cash Management | Sales | Purchasing | Setup & Extensions | **NETRONIC VAPS** | Netronic VPS | Netronic VJS | ☰

---

INSIGHT FROM LAST WEEK

Your top customer was **Klubben**, bought for £11,772

○ ● ○ ○ ○

Activities

Activities | INTELLIGENT CLOUD

SALES THIS MONTH: £89,246 > See more

OVERDUE SALES INVOICE AMOUNT: £168,282 > See more

OVERDUE PURCH. INVOICE AMOUNT: £81,873 > See more

SALES INVOICES PREDICT... OVERDUE: 0 > See more

ACTIONS

- + Sales Quote
- + Sales Order
- + Sales Invoice
- + Purchase Quote
- + Purchase Order
- + Purchase Invoice
- > New
- > Payments
- > Reports
- > Setup
- Excel Reports

2. Define which kind of demand type should get supplied first, second, third etc. This is done in the "EMAD Demand" dialog under "Manage -> Edit List". Here you can also change the priority order:

← EMAD DEMAND PRIORITY | WORK DATE: 1/28/2021 ✓ SAVED 📌 🗑️ 🔗

🔍 Search + New 🗑️ Edit List 🗑️ Delete 📄 Open in Excel 🔍 ☰

	Priority	Document Type ↑
→	1	Sales Line
	2	Sales Line
		Service Line
		Job Planning Line
		Prod. Order Component
		Assembly Component
		Transfer Line

## 5.9. How to set up the scheduling parameters

The VAPS offers two semi-automatic scheduling tools, the functions "Add all" and "Fill idle times" either with or without taking into account the EMAD. The settings described below make sure that these functions work properly. All settings can be found in the VAPS Setup:

## VAPS Setup

---

**Material Availability**

---

Look Ahead Window ..... 3M

---

**Scheduling Parameters**

---

Consider EMAD when... ☐
Scheduling Start (relat... -2W

Consider EMAD when... ☒
Max. Number of Sche... 3

- **Consider EMAD when Adding all:** With the function "Add all" you can schedule a bunch of production orders in one go. Tick this option, if the EMAD is also be taken into account, when using "Add all".
- **Consider EMAD when Filling Idle Times:** The function "Fill Idle Times" helps you to avoid idle times on machine centers and thus use your capacities to the fullest extent possible. If you want to take into account EMAD when "Fill Idle Times" is used, tick this option.

**Recommendation:** If material availability is crucial for you, switch on both options, so that you never schedule without having material available.

- **Scheduling Start:** Here you can define the scheduling start for the two functions, starting from the current work date. This will be indicated in the plan by a blue vertical line.

**Recommendation:** We recommend to initially set it to "2D" or "3D" to the short-term schedule as stable as possible.

- **Maximal Number of Scheduling Iterations:** This option is mostly related to the "Fill idle times" functions and lets you specify how often the scheduling process shall be carried out. No matter which number you have entered here, the process will be stopped, when it brings no more change to the schedule.

**Recommendation:** We recommend to start with 5, if this takes too long, reduce to 3. But at least enter 1 here.

## 6. Integrating with Microsoft Dynamics 365 Business Central

### 6.1. Integrating with Business Central standard manufacturing

The VAPS integrates with some standard Business Central tables & function:

- Work/machine centers

- Shop calendars
- Production orders
- Routings

### 6.1.1. How does the VAPS integrate with work/machine centers?

In the plan, work center groups, work centers and machine centers are shown as follows:

Capacities		Mo, 25. Jan 2021		Tu, 26. Jan 2021		We, 27. Jan 2021		Th, 28. Jan 2021		Fr, 29. Jan 2021
		05:30	12:00	00:00	12:00	00:00	12:00	00:00	12:00	00:00
▲ Machining	Work Center Group									
▲ Cutting	Work Center									
Standby (∞)	Machine Center „Standby resource“, automatically added to each work center									Required Due Date
Cutting #1	Machine Center									
Cutting #2	Machine Center									
Cutting #3	Machine Center									

By double-clicking you can open the according Business Central card:

101035 · 3 Operations Subcontracting in Middle as Alternative

Process Order | More options

**General**

No. 101035 Quantity 25

Description 3 Operations Subcontracting in Middle as Alternative Due Date 1/28/2021

Description 2 Required Due Date 1/28/2021

Source Type Item Assigned User ID

Source No. 3006 Last Date Modified 8/12/2020

Search Description 3 OPERATIONS SUBCONTRACTING Color (VAPS) #9d00ff

**Lines** Manage More options

Item No.	Due Date	Description	Starting Date-Time	Ending Date-Time	Quantity
→ 3006	1/28/2021	3 Operations Subcontracting in Middle as Alternative	1/26/2021 12:15 ...	1/27/2021 4:00 PM	25

Please note that if you add a work center without a machine center, this work center won't show in the plan due to the concept of finite capacity scheduling.

### Shop calendars

In Business Central, the work times come via the work center. This means, that you have to specify a shop calendar code on the Work Center card and this shop calendar code then defines the work times/non-work times.

**Scheduling**

Unit of Measure Code MINUTES

Capacity 3

Efficiency 100

Consolidated Calendar ☒

Shop Calendar Code 1

Queue Time

Queue Time Unit of Meas. Code

Code	Description
→ 1	One shift Monday-Friday
2	Two shifts Monday-Friday

+ New Select from full list

Please note that you need at least one shop calendar code. If you have multiple work centers with multiple shifts you need multiple shop calendar codes.

### Add capacity to machine center

In addition you'll have to update the capacity of the machine center. The machine center inherits the calendar of the work center but you need to specify this on the machine center card.

**CALC. MACHINE CENTER CALENDAR**

**Options**

Starting Date ..... 1/1/2021

Ending Date ..... 12/31/2021

**Filter: Machine Center**

x No. ....

+ Filter...

Filter totals by:

+ Filter...

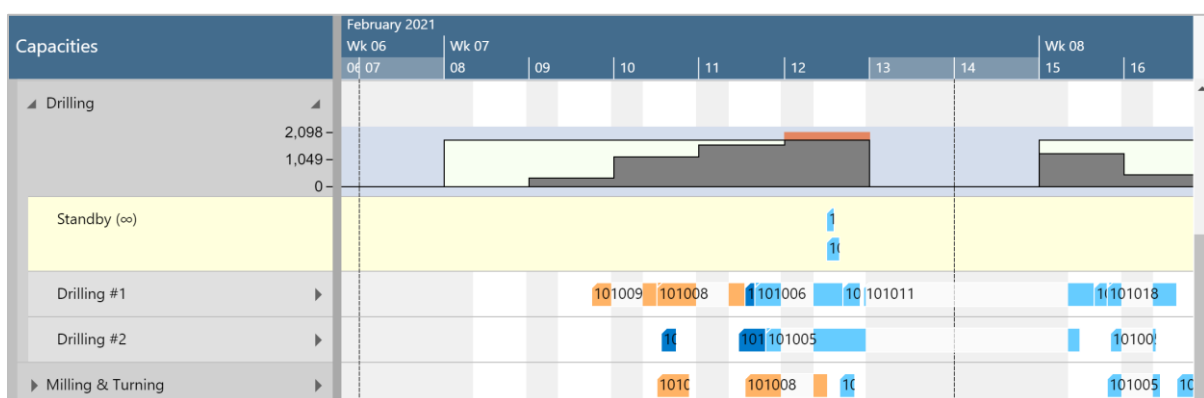
Schedule... OK Cancel

No. ↑	Name
110	Cutting #1
120	Cutting #2
130	Cutting #3
210	Drilling #1
220	Drilling #2
310	Milling #1
315	Milling #2
320	Turning #1
330	Milling & Turning
410	Assembly station
420	Assembly station
430	Assembly station
440	Assembly Station #4

	01/31/21	02/01/21	
	900.00		
	900.00		
	900.00		
	900.00		
	900.00		
	900.00		
	900.00		
	900.00		
	900.00		
	900.00		
	480.00		
	480.00		
	480.00		
	480.00		
	480.00		

### The capacity curve

The capacity curve shows the capacity of a work center group. It is calculated by taking the capacity per day from the shop calendar and multiply it by the number of machine centers.

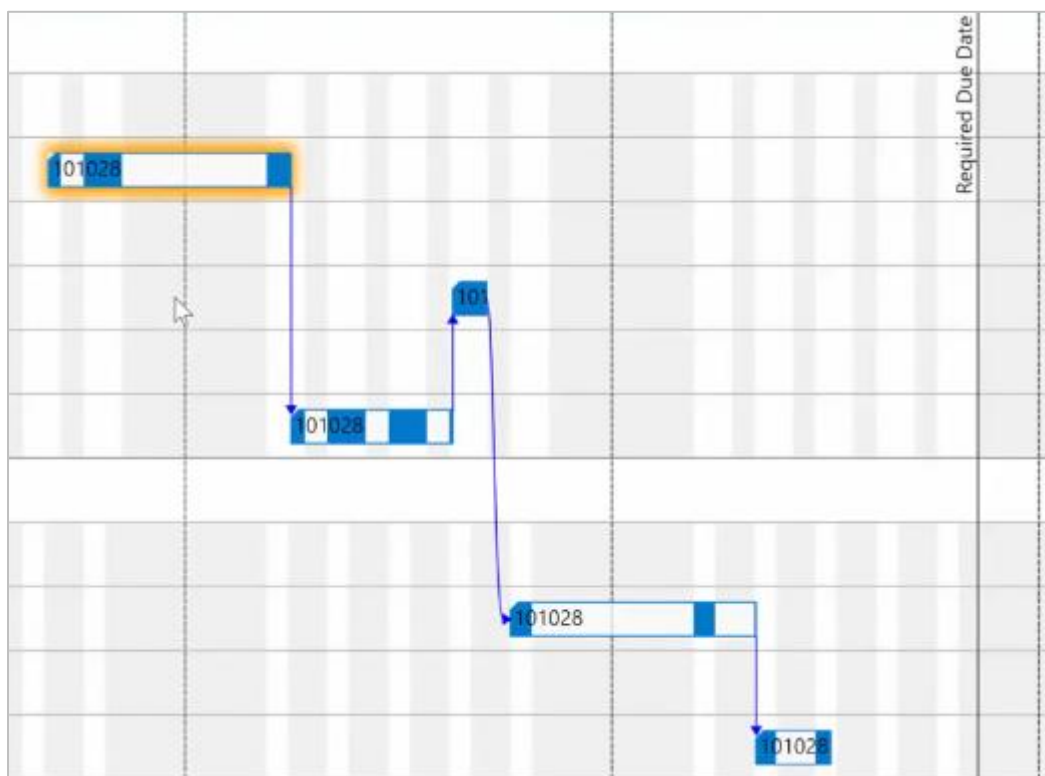


### 6.1.2. Production orders

Production orders are represented in the VAPS by the bars of the single operations. Double-clicking a bar will open the respective card:

The following production order data are visualized in the plan:

- production order number: displayed on the bars
- starting date/time - when the first operation of the production order starts
- ending date/time - when the last operation of the production order starts
- required due date, a field added by us : symbolized by a vertical line, shown for the production order just selected
- order in which operations are worked off, coming from the routing - visualized by links

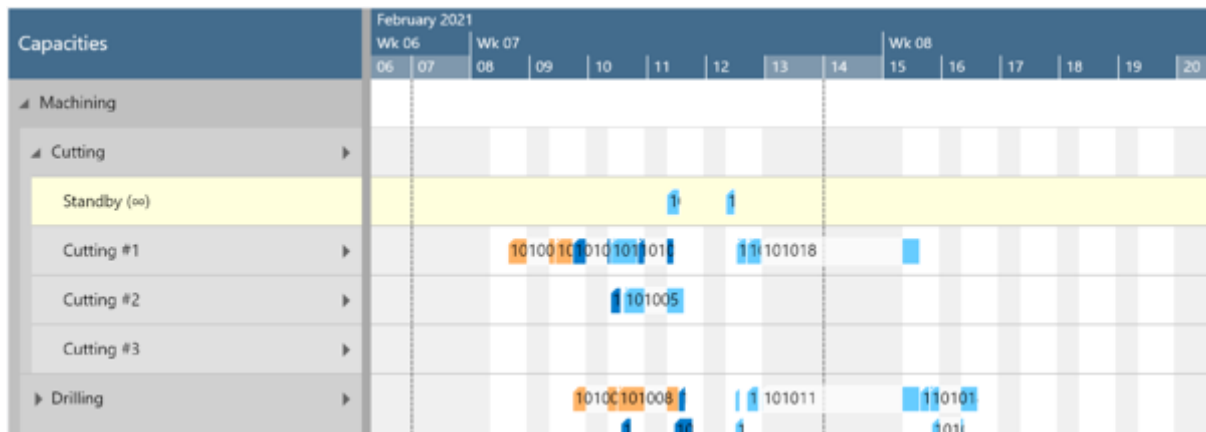


### 6.1.3. Standby resource

The standby resource contains all production order routing lines/operations that are not yet scheduled from within the VAPS, and hence are just scheduled by the Business Central scheduling run.

The standby resource gets highlighted by a yellow background (and an infinity symbol next to its name in the table part):





You can also get an overview of orders that are not yet scheduled by the VAPS in the simulation data:

	Schedu... by VAPS	StandBy
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>	<input type="checkbox"/>

## 6.2. Output and consumption postings

Output and consumption postings can be seen as information about the progress of your production execution. When you post output or consumption on your production order line you basically tell your system that you started or finished an operation or that you have achieved a certain percentage of completion.

### 6.2.1. Fundamentals on output/consumption postings:

- Output/consumption postings can happen very often, sometimes, even automatically
- They reflect a constant data updating process
- No impact on an existing simulation:
  - The simulation doesn't get outdated
  - The simulation doesn't get invalid
- The progress information you see in the visual schedule is about the moment in time when you created your simulation.
- After posting output/consumption you have to create a new simulation

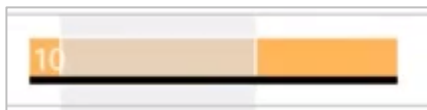
### 6.2.2. The impact of the production order status

- You can only post output and consumption to a released production order
- Any output/consumption posting on a released production order results in showing a progress bar in the VAPS

### 6.2.3. Visualization of progress information in the VAPS

For production order routing lines of released production orders a slim progress bar is displayed below the actual bar being based on the posted quantity consumption. The color of the progress bar appears as follows:

- finished: black



- still in progress and output/consumption  $\leq$  originally planned quantity: grey



- still in progress and output/consumption  $>$  originally planned quantity: red



Please note, that

- you can only post output and consumption to a released production order
- Operations that are already in progress, cannot be moved any more
- the percentage of completion is shown in relation to the net working time.

### 6.2.4. Special case: Posting on an operation that is still on the standby resource

This is an absolutely rare case that normally should not happen, but you need to be aware of it.

Important to know

- If you post output/consumption on an operation that is still on the standby resource, this operation gets automatically moved to the machine center that is specified in the routing because if an operation is started (what the posting actually means) it de facto cannot be on the standby resource any longer.
- If there already is another operation on this specific machine, this could actually result in an overload which the planner has to fix manually.

## 7. Finite Capacity Scheduling Instruments

### 7.1. What is finite capacity scheduling?

The VAPS works with finite capacity scheduling. Finite capacity scheduling means to schedule with limited capacities:

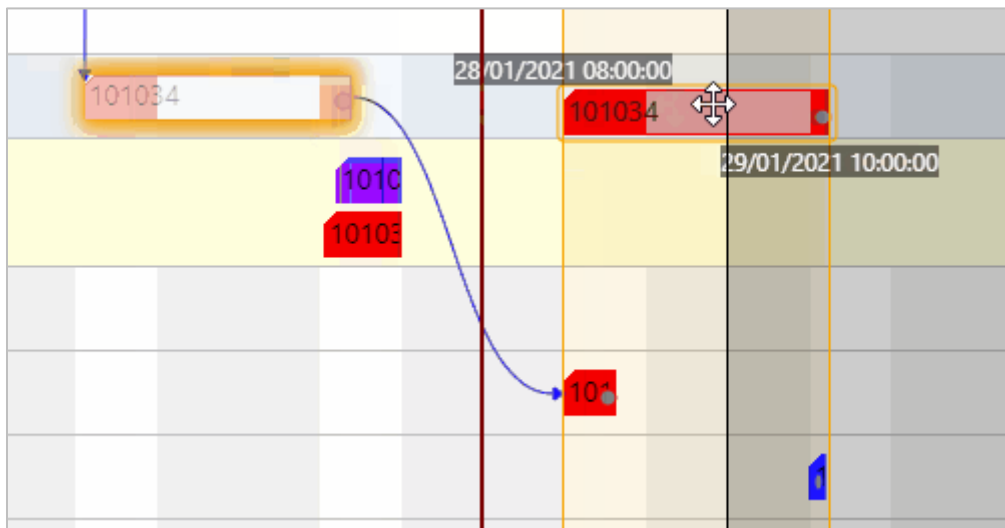
- The default assumption is to have a capacity of 1 per machine center, meaning that each machine can just work on one operation at a given point of time
- It makes sure that you do NEVER overload a machine center.
- Any change in the schedule leads to automatic recalculation of the entire schedule.
- This principle is also applied to complex routings:
  - serial
  - parallel
- Dependencies are taken into account:
  - dependencies between operations (of one production order)
  - dependencies between production orders (if made from reservations)

### 7.2. Drag & Drop

Operations can easily be scheduled and rescheduled interactively by drag & drop considering the rules of finite capacity scheduling.

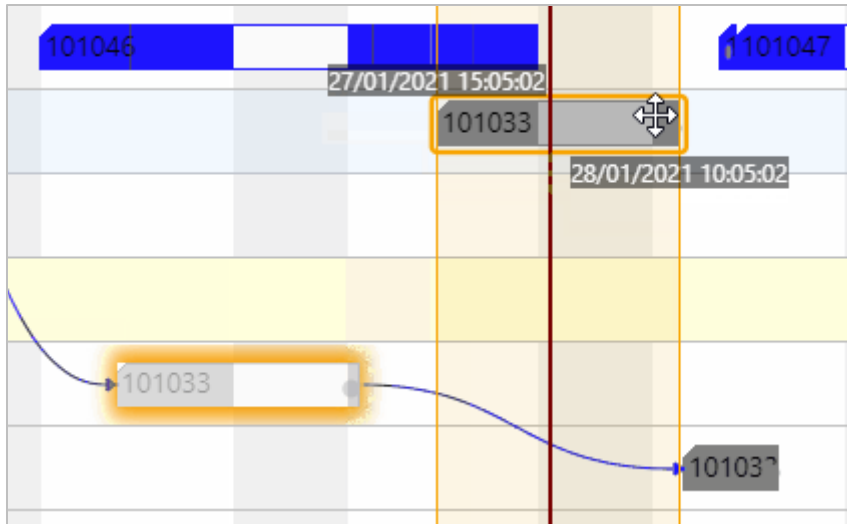
#### 7.2.1. Change timing of operation

If you move an operation horizontally along the time scale you'll change the timing. While moving the operation, a “phantom” bar will remain at the original place until the mouse gets released.



### 7.2.2. Change resource of operation

If you move an operation vertically you can change the machine center where the operation is to be worked upon. While moving the operation, a “phantom” bar will remain at the original place until the mouse gets released.

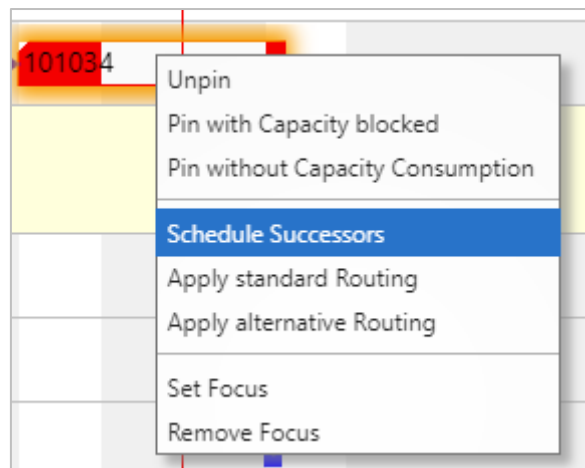


### 7.2.3. The underlying principles of drag & drop

- The sequence on a machine can be changed.
- Can have an impact on other machines (as successors might get moved).
- We do not allow you to violate the routing structure (exception: if
- operations are pinned)
  - predecessors will never be impacted
  - right move -> successors will get moved
  - left move -> successors will not get moved

### 7.3. Schedule successors

With this instrument you tell the software to give the current production order the highest priority from here. The function "Schedule successors" can be found in the bar's context menu:



By ticking this item, you schedule all successors of the currently marked operation (if you marked the first operation of a production order then, of course, the complete production order will get scheduled).

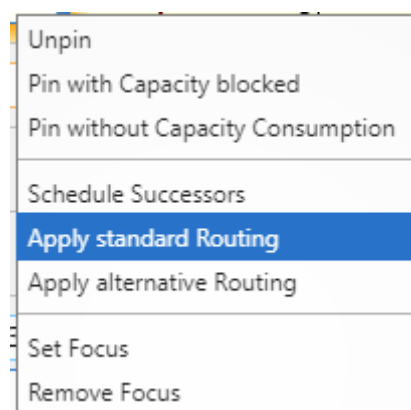
#### 7.3.1. The underlying principles of “Schedule Successors”

- Changes the timing (start date; hence: end date) of all successors.
- Will not change the sequence on the machine where it is triggered.
- Has an impact on other machines (as successors will get moved).
- Will not violate the routing structure.

#### 7.3.2. Apply standard routing

This instrument is meant to help you efficiently bring production orders from the standby resource to a dedicated machine center.

The function "Apply Standard Routing" can be found in the bar's context menu:



By ticking this item you add the operations of a production order to the schedule starting from the one currently marked without changing the schedule and using the standard machines from the standard Business Central routing.

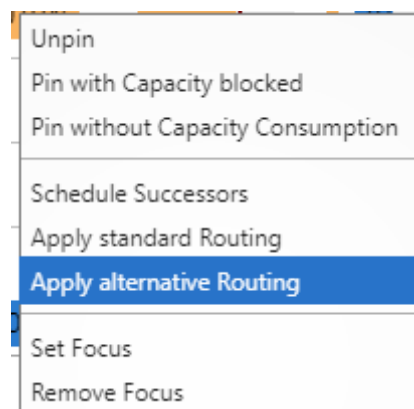
### 7.3.3. The underlying principles of "Apply Standard Routing"

- Changes the assigned machine center of the triggering operation and all successors (move from standby to a concrete machine center).
- Changes the timing (start date; hence: end date) of all successors.
- Adds this production order to the schedule with the lowest priority.
- Will not change the sequence on any machine.
- Will not violate the routing structure.

## 7.4. Apply alternative routing

This instrument is meant to help you efficiently bring production orders from the standby resource to a dedicated machine center simultaneously looking for the best alternatives (i.e. earliest completion)

The function "Apply Alternative Routing" can be found in the bar's context menu:



By ticking this item you add the operations of a production order to the schedule starting from the one currently marked without changing the schedule but making sure that it will be finished as early as possible. For this, the alternative routing you have defined will be used.

### 7.4.1. The underlying principles of "Apply Alternative Routing"

- Changes the assigned machine center of the triggering operation and all successors (move from standby to a concrete machine center).
- Changes the timing (start date; hence: end date) of all successors.
- Adds this production order with the lowest priority applying an ASAP strategy
- Will not change the sequence on any machine.
- Will not violate the routing structure.

## 7.5. Schedule production orders from standby in one go by the "Add all" function

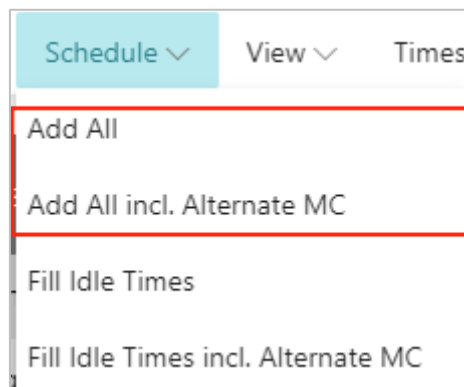
With the function "Add all" you can schedule a bunch of production orders in one go, taking into account alternate machine centers, if desired.

Production orders that are not yet scheduled in the VAPS, are shown on the respective standby resource - a collection, so to say, of production orders that need to be added from the scheduler to the schedule. So far, each production order was treated individually which meant that also if there were several production orders to be added, you nevertheless had to add them one after the other, which, in case of a lot of production orders could really take some time. With the function "Add all" you can now add them to the schedule all at once.

Of course, this doesn't happen at random, but follows strict prioritization rules.

### 7.5.1. How it works

- Based on the assumption that late production orders are to be avoided, the VAPS automatically creates a prioritized list of the production orders that are on standby, proceeding as follows:
  - calculating a buffer time per production order, following the formula:
  - $\text{buffer time} = [\text{required due date}] - [\text{end date of last operation as per BC}]$
  - starting with released production orders, then firm planned, then planned
  - within each category, assigning the highest priority to production orders with the lowest buffer, the next highest to those with the next lower buffer, etc.
- The orders are added to the schedule according to their priority
- The following settings can be made in the VAPS setup:
  - define the "schedule start" date
  - decide whether you want to take into account EMAD
  - specify the number of iterations
- When you start the scheduling process under "Actions -> Schedule", click the according option to determine whether you want to take into account alternate machine centers or not.

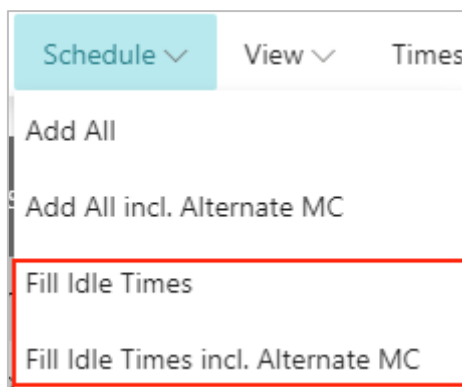


### 7.6. Fill idle times

Typically, scheduling with finite capacities, will often lead to idle times on machine centers and of course, for the sake of efficiency and cost cutting, everybody in planning wants to use their capacities to the fullest extent possible. The function "Fill idle times" helps to avoid idle times on machine centers.

### 7.6.1. How it works

- The VAPS automatically creates a prioritized list of the production orders that are already assigned to machine centers, following the same strict prioritization rules as in the "Add all" function.
- All operations are tried to be moved forward to avoid idle times.
- Already scheduled production orders are not getting pushed out (they are only squeezed in).
- The following settings can be made in the VAPS setup
  - define the "schedule start" date
  - decide whether you want to take into account EMAD
  - specify the number of iterations
- When you start the scheduling process under "Actions -> Schedule", click the according option to determine whether you want to take into account alternate machine centers or not.



## 7.7. Calculating and working with earliest material availability

The VAPS takes into account the earliest material availability date = EMAD.

### 7.7.1. Material availability: Fundamentals

As of now, we calculate the material availability per production order, meaning on production order level, not on routing line/operation level:

- We calculate a value that we call EMAD = earliest material availability date

### 7.7.2. Basics of the EMAD calculation

- We create a unique list of component demand day by day
- We take into account
  - Demand from production orders
  - Demand from sales orders

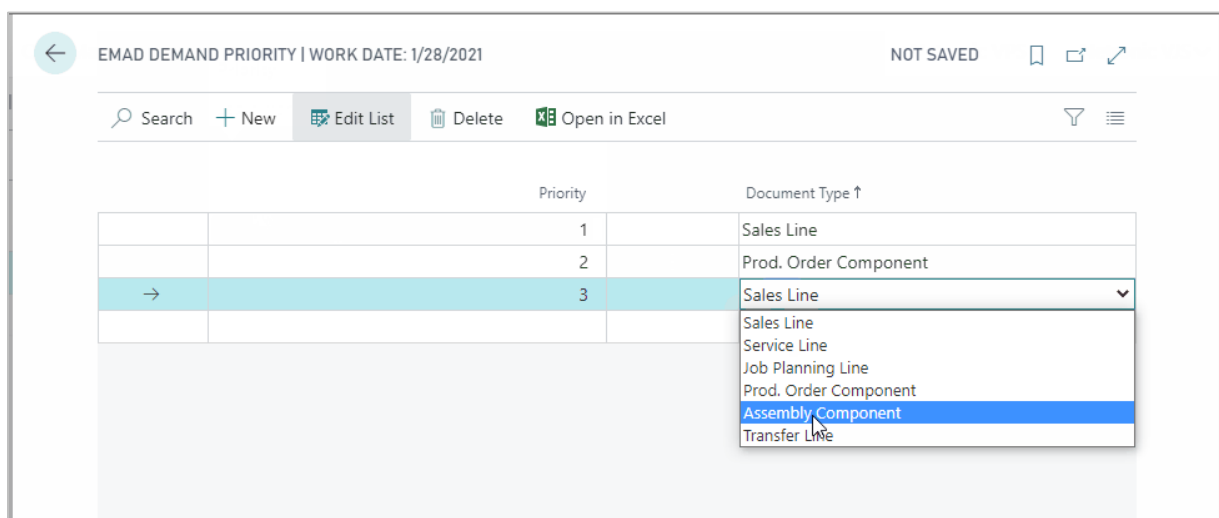


- Demand from transfer lines
- Demand from job planning lines
- Demand from service lines
- Demand from assembly orders
- Then we create a unique list of component supply day by day
- We take into account
  - Supply on inventory
  - Supply from purchase orders
  - Supply from production orders
  - etc.
- Then we allocate component supply to component demand

### 7.7.3. How we allocate

- First we remove any reservations, because reserved components will never get allocated
- Then, day by day, we allocate an available component to a component demand
- You can define the priority which demand to supply first

Example: sales orders first, then production orders, then transfer orders



- If there is enough component supply on a certain day, we allocate that supply to the component line, and have an earliest material availability date for that component.

<b>Supply</b>	Monday	Tuesday	Wednesday	Thursday	Friday
Component 1	100	500	300	50	600
<b>Demand</b>	Monday	Tuesday	Wednesday	Thursday	Friday
Component 1	50	600	300	250	601
<b>Allocation</b>	Monday	Tuesday	Wednesday	Thursday	Friday
Component 1	YES (50)	NO	YES (300)	NO	NO
<b>EMAD</b>	Monday	Tuesday	Wednesday	Thursday	Friday
Component 1	Monday	none	Wednesday	none	none

#### 7.7.4. Setting the EMAD

A production order typically requires multiple components. If all components are available in the look ahead window timeframe, each component line gets an EMAD. We take the latest EMAD of all component lines as the EMAD for the production order. Example:

- Production order 1
  - Component 1 – EMAD = December 1
  - Component 2 – EMAD = November 20
  - Component 3 – EMAD = December 4
- EMAD for production order 1 = December 4

## 8. Simulations

### 8.1. What is this simulation idea all about?

The Visual Advanced Production Scheduler does not just support one version of the schedule. You can create multiple simulations and scenarios, then compare them, and then publish the one that fulfills your purpose best.

Simulations are somewhat a cornerstone of the Visual Advanced Production Scheduler. In essence, the idea is as follows:

1. You can create a snapshot of the current production schedule.
2. This snapshot is saved as a copy of the production schedule. That way, your Dynamics 365 Business Central database does not get impacted.

3. You then can work with that snapshot (i.e. that copy) and check how certain changes to your schedule would impact your entire production schedule.
4. You can take as many snapshots as you like. Hence, you can build as many schedule scenarios as you need.
5. If you have a simulation/ scenario that you want to use as a new production schedule going forward, you can publish it. That way, your Dynamics 365 Business Central database gets updated.
6. As long as you do not publish, the Business Central database does not get changed.

Some additional facts that are important to know:

- You can view each simulation both in tabular form and as a visual planning board,
- You can use the visual schedule to make drag & drop changes to a simulation.
- Any change that you do to a simulation gets automatically saved in the simulation table.

## 8.2. How does the production simulations page work?

We have our own page to manage simulations. It is called "production simulations". Here, you can create, change and publish simulations.

You can access the "production simulations" page from the NETRONIC VAPS menu, or by simply searching for "production simulations". The production simulations page looks as follows:

Simulations: All					
<a href="#">Search</a> <a href="#">Manage</a> <a href="#">EMAD Allocations</a> <a href="#">Create Simulation</a> <a href="#">View Simulation</a> <a href="#">Update Simulation</a> <a href="#">Publish Simulation</a> <a href="#">View Simulation Data</a> <a href="#">Compare Simulations</a>					
Description	Default View Color Type	Invalid	Outdated	Creator	Created On ↑
Simulation Created on 06/30/20 09:13 AM	Wait Times	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ADMIN	6/30/2020 9:14 AM
Simulation Created on 06/30/20 09:42 AM	Production Order View	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ADMIN	6/30/2020 9:42 AM

As you can see, this page consists of certain functions and a specific table. Let's have a look at both separately.

### 8.2.1. Functions of the simulations page

The following functions are available on the "production simulations" page:

- **Search:** The search field starts a dynamic search within the description column of the simulations overview table below. The list of simulations is automatically adapted while you type in your search term.
- **Edit list:** This is standard Dynamics 365 Business Central functionality and allows you to edit the list below.
- **Delete:** You can delete the selected simulation. You can also select multiple simulations (press edit list first) and then delete them in one go. Please note: ***you cannot undo a deletion.***
- **Create a simulation:** Create a new simulation that is based on certain criteria such as timeframe and production order status. Here is more detailed information about how to create a simulation.

- **Publish simulation:** Select a simulation from the table below and publish it. A publish updates the underlying Dynamics 365 Business Central database. Once published, the respective simulation is removed from this table on the "production simulations" page.
- **View simulation:** Select a simulation in the table below and click "view simulation" to open the visual schedule in which you can manage your production simulation via drag & drop.
- **View simulation data:** With "view simulation data" you open a tabular view of all data that are part of the selected simulation.
- **Compare simulations:** You can compare different simulations and decide which one suits you best.
- **Filter:** Click on the filter icon to define and apply a filter to the table below.

### 8.2.2. Content of the simulations overview table

- **Description:** You can name a simulation with any description that you want. You can do this when you create the simulation. Or you can just click on a table cell in the "description" column and type in any name for that specific simulation. If you do not give a description on your own, the VAPS will determine one (like in the above table, where it says "Simulation No. 0 on 07/22/19").
- **Default view color type:** Select the color scheme (see separate article on color schemes) that you want to apply when you view the simulation.
- **Created on:** Date on which this specific simulation was created.
- **Production order lines count:** Number of production orders that are included in this specific simulation.
- **Production routing lines count:** Number of production order routing lines that are included in this specific simulation.

### 8.3. How do I create a new simulation?

We have our own page to manage your simulations. It is called "production simulations". Here, you can create a simulation by applying various criteria.

You can create as many simulations as you like. Each simulation is a snapshot of your current schedule, which you then can change via drag & drop in the visual scheduler. We keep each simulation persistent as long as you either publish or delete it.

You can create a new simulation on the "production simulations" page, which you can access from the NETRONIC VAPS menu, or by simply searching for "production simulations". The production simulations page looks as follows:

PRODUCTION SIMULATIONS   WORK DATE: 1/28/2021					✓ SAVED	
Search	Edit List	Delete	Create Simulation	Publish Simulation	View Simulation	View Simulation Data
DESCRIPTION	DEFAULT VIEW COLOUR TYPE	CREATED ON	PROD. ORDER LINES COUNT	PROD. ROUTING LINES COUNT		
Simulation No. 0 on 07/22/19	Prod. Order Status	7/22/2019 10:40 AM	23	131		
Released production orders - 07/22/19	Item View	7/22/2019 11:48 AM	6	42		

If you click "**create simulation**", a new page opens:

EDIT - CREATE SIMULATION



## Saved Settings

Changes to the options and filters below will be saved only to: 'Last used options and filters'

Use default values from:

Last used options and filters



## Filters

Minimum Status	Planned	▼
Earliest Date	1/1/2021	📅
Latest Date	5/31/2021	📅

OK

Cancel

With this page, you define - in the **filters** section - certain criteria that should get applied for your simulation.

In the above case, the simulation (remember: this is the snapshot of your overall schedule that you then want to work with) includes all production orders with the minimum production order status "planned that start on or after 1 January 2021 and finish on or before 31 May 2021.

Minimum status "planned" means that this simulation includes all production orders with the status planned, firm planned and released.

**By clicking OK, a new simulation is created.**

**Pro tip: You can also define regularly used filters!**

### 8.3.1. How to define regularly used filters

If you have filters that you want to apply multiple times, it makes sense to define them once. In order to do so, click the downward-facing triangle in the dropdown menu under "saved settings" and then click "select from full list".

EDIT - CREATE SIMULATION

**Saved Settings**

Changes to the options and filters below will be saved only to: 'Last used options and filters'

Use default values from: Last used options and filters

**Filters**

Minimum Status

NAME

Last used options and filters

Released March

Select from full list

A new page opens, from where you can manage (i.e. create, edit and delete) all your filters:

SELECT - REPORT SETTINGS

Search Edit List Delete New Copy Edit Show Attached Open in Excel

NAME	REPORT ID	REPORT NAME	ASSIGNED TO	CREATED BY	SH... WITH ALL US...	COMPANY NAME
Last used options and filters	5526150	Create Simulation	ADMIN	ADMIN	<input type="checkbox"/>	CRONUS Internati...
Released March	5526150	Create Simulation	ADMIN	ADMIN	<input type="checkbox"/>	CRONUS Internati...

OK Cancel



When you click "new", you can create a new filter with certain criteria. Here is how the "Released March" filter was defined:

## EDIT - CREATE SIMULATION



### Filters

---

Minimum Status .....	Released ▼
Earliest Date .....	3/1/2021 
Latest Date .....	3/31/2021 

Once defined, you can also apply this filter if you create a new simulation:

EDIT - CREATE SIMULATION

### Saved Settings

Changes to the options and filters below will be saved only to: 'Last used options and filters'

Use default values from: Released March

### Filters

Minimum Status Released

Earliest Date 3/1/2021

Latest Date 3/31/2021

OK
Cancel

## 8.4. How do I publish a simulation?

We have our own page to manage your simulations. It is called "production simulations". From here, you can publish a simulation. "Publish" means that we update the underlying Dynamics 365 Business Central database.

You can publish a simulation from the "production simulations" page, which you can access from the NETRONIC VAPS menu, or by simply searching for "production simulations". The production simulations page looks as follows:

PRODUCTION SIMULATIONS | WORK DATE: 1/28/2021

✓ SAVED

Search
Edit List
Delete
Create Simulation
Publish Simulation
View Simulation
View Simulation Data

DESCRIPTION	DEFAULT VIEW COLOUR TYPE	CREATED ON	PROD. ORDER LINES COUNT	PROD. ROUTING LINES COUNT
Simulation No. 0 on 07/22/19	Prod. Order Status	7/22/2019 10:40 AM	23	131
Released production orders - 07/22/19	Item View	7/22/2019 11:48 AM	6	42



If you click "**publish simulation**", the selected simulation gets published. Once it is published, it gets automatically deleted and removed from the above-shown table.

**Please remember: "publish" means that we update the Dynamics 365 Business Central database. "Publish" means that the simulation becomes your new production schedule.**